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The following statement-of-purpose appeared in the Introduction to the first issue of **Herpetological Review** in 1967 (Corson Hirschfeld, Editor):

> "**Herpetological Review** incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the **Review** will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to all persons in herpetology and we hope all members will find it informative and entertaining."

Herpetological Review still remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the **Journal of Herpetology**—see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Manuscripts submitted **must** be typed, double-spaced, on 8½ X 11 paper, and should be sent in duplicate. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles may also be submitted. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of the unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

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Membership is open to anyone interested in amphibians and reptiles. Members have voting privileges in the Society. They receive the **Journal of Herpetology** (four issues per year), **Herpetological Review** (four issues per year), **Herpetological Circulars**, and several **Facsimile Reprints in Herpetology**. Members may purchase other Society publications at reduced rates.

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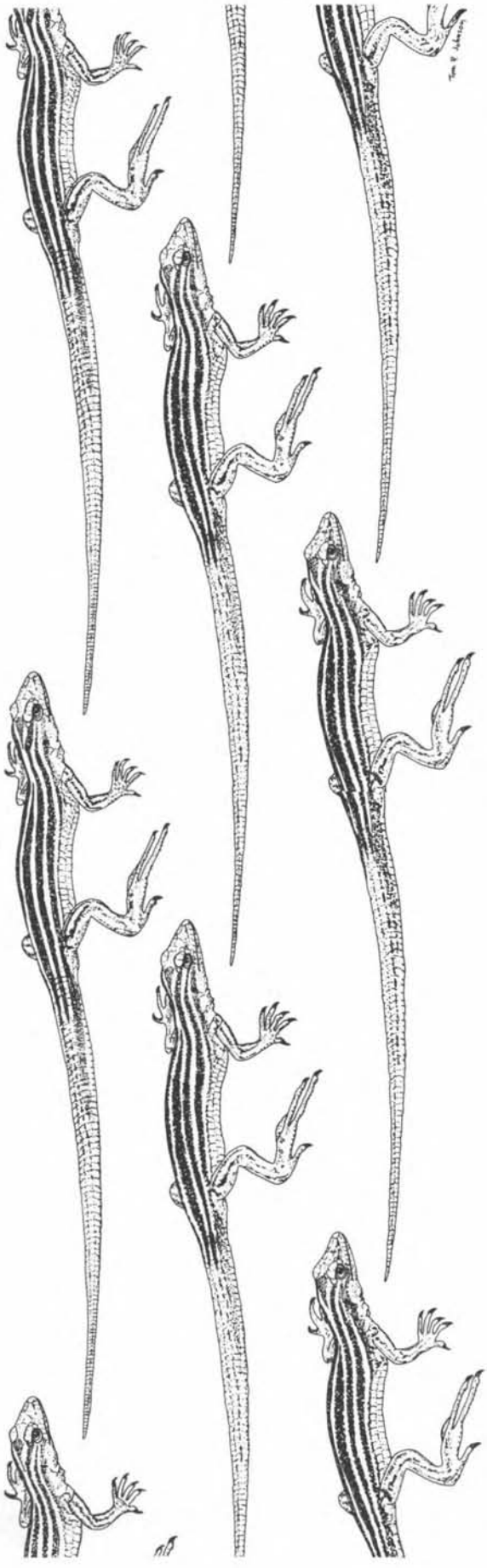
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Contents

Annual Meeting, 1981 86

SSAR BUSINESS

Election results 86
Report of common names committee 86
SSAR Grants in herpetology 92

FEATURE ARTICLES

Arthur Loveridge 1891-1980, by R. Conant 87
First reptile breeding certificate nominations received 88
Federal regulations for the importation of antivenin, by J. Bowler 88
A bicephalic *Crotalus horridus* from Alabama, by D. Lasher 89
An instance of natural cannibalism by *Uma n. notata* Baird, by R. Sugerman and J. Applegarth 90
Vocalizations by the Mexican hylid frog *Hyla taeniopus*, by B. Stewart 90
A large egg clutch from an eastern hognose snake, *Heterodon platythinos*, by R. Davis and W. Maynard 91
Handler beware! Large constrictors can kill!, by R. Davis 91
Bilateral cleft labial and palate in the progeny of a *Crotalus viridis viridis* Rafinesque, by J. Dean et al. 91
Earthworm *(Lumbricus terrestris)* consumption in captive garter snakes *(Thamnophis sirtalis)*, by W. Alpaugh 93

REGIONAL SOCIETY NEWS

Regional Societies Directory 103
British Herpetological Society 104

HERPETOLOGICAL STUDY OPPORTUNITIES

Ohio University (Athens) 104

POSITIONS 104

LEGISLATIVE ALERT

Federal controlled species, by T. Berger 105

BOOK REVIEWS

International Zoo Yearbook, Vol. 19, by G. Pisani 106
Red Book of USSR, by G. Mamonov 106
Hawaiian Reptiles and Amphibians, by H. Seibert 106

TECHNIQUES

An improved design for a thread trailing device used to study terrestrial movements of turtles, by A. Scott and J. Dobie 106
Underwater traps for turtles, by R. Feuer 107

HERPETOLOGICAL HUSBANDRY

Captive propagation of endangered Houston toads, by H. Quinn 109
Captive reproduction of *Vipera russelli* (Shaw, 1797), by G. Naulleau and B. van den Brule 110

NEWSNOTES 113

GEOGRAPHIC DISTRIBUTION

New records 114
Distributional records for Johnson Co., Texas, by G. Carl 116
Occurrence of *Pelamis platurus* (Linnaeus) in El Salvador, by H. Hidalgo 117

CURRENT LITERATURE 120

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ANNUAL MEETING

The 24th Annual Meeting of
THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES
AND
The 29th Annual Meeting of
THE HERPETOLOGISTS' LEAGUE
will be hosted by
MEMPHIS STATE UNIVERSITY
Memphis, Tennessee
9-14 August 1981

FEATURED SYMPOSIUM: Reproductive Biology of Reptiles

PROGRAM SUMMARY:

Sunday, 9 August	Registration; SSAR Board of Directors Meeting; HL Board of Trustees Meeting; Fifth Annual SSAR Regional Herpetological Societies Conference
Monday, 10 August	HL Distinguished Herpetologists Lecture by Ernest Williams; Contributed Papers; Poster Session; Symposium on Reproductive Biology of Reptiles; SSAR/HL Liaison Committee Meeting; Herp Art Exhibit; Commercial Exhibitors' Display; Social
Tuesday, 11 August	Contributed Papers; Poster Session; Symposium on Reproductive Biology of Reptiles; Herp Art Exhibit; Live Herp Exhibit; Commercial Exhibitors' Display; SSAR Business Meeting; Barbecue at Schlitz Belle
Wednesday, 12 August	Contributed Papers; Poster Session; Symposium on Reproductive Biology of Reptiles; Herp Art Exhibit; Live Herp Exhibit; HL Business Meeting; Riverboat Dinner Cruise
Thursday, 13 August	Contributed Papers; Poster Session; Herp Art Exhibit; Live Herp Exhibit
Friday, 14 August	Live Herp Exhibit; Tour of Memphis Zoo and Aquarium

GENERAL INFORMATION:

Pre-registration forms, including the call for papers and other information, will be mailed to members of the two societies in March 1981. Copies of the meeting information will be sent on request to interested persons. The deadline for receipt of abstracts will be 5 June 1981. A regular pre-registration fee of $25, or a student fee of $15, will be due *no later than 5 June 1981*. The regular registration fee at the meeting will be $30, with a student fee of $20.

Housing in an air-conditioned dormitory will be available at $10.20 per person per day for double occupancy (4 sharing bath); $16.80 per person per day for single occupancy (2 sharing bath); or $24 per day for a family (only) suite consisting of two rooms (4 beds) with a connecting bath.

Transportation: Individuals planning to travel by air should make reservations into Memphis International Airport. A shuttle to campus will be provided. Camping facilities are available in the Memphis area.

Special Activities: Spouse and family trips to Libertyland Amusement Park, Chucalissa Indian Museum, Memphis Pink Palace Museum, Brooks Memorial Art Gallery, or Memphis Botanical Gardens may be organized depending on interest. Daytime child care facilities may be available if there is sufficient demand.

LOCAL COMMITTEE CHAIRMAN:

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SSAR BUSINESS

SSAR ELECTION RESULTS

Six hundred and seventy-four SSAR members responded to the mail ballot to elect SSAR officers for calendar 1981. The following individuals were elected:

President-elect:	Kraig Adler
Secretary:	Joseph T. Collins
Treasurer:	Henri C. Seibert
Board of Directors:	Max A. Nickerson
(Class of 1983)	Marvalee Wake

It is of interest to note that Richard Nixon and Bert Lance each received one write-in vote for the offices of secretary and treasurer, respectively. However, neither is eligible for SSAR office since they are not SSAR members.

The SSAR thanks all candidates for accepting the nomination to run for SSAR office. In addition, the Society is grateful to Jerry D. Johnson, El Paso Community College, for ably serving as SSAR elector for 1980. ●

REPORT OF THE SSAR COMMITTEE ON COMMON AND SCIENTIFIC NAMES FOR 1980

This report is the third annual update prepared by the SSAR Committee on Common and Scientific Names for North American amphibians and reptiles (north of Mexico). This report (and future reports) is compiled to fulfill the charge to our committee to keep the herpetological community informed of published taxonomic shifts and new descriptions, and to propose or record new common names brought about by same. In addition, this third update permits us to record recent changes overlooked and not included in "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" (Collins *et al.*, 1978).

The proposed changes and taxonomic shifts listed below are in order as they appear in our list (Collins *et al.*, 1978).

PAGE 14, genus *Chrysemys:* Pritchard (1979) and Vogt and McCoy (1980) proposed reviving the generic name *Pseudemys* for all species listed under the genus *Chrysemys* except *C. picta*. The common names for the affected species and subspecies remain the same. The genus *Pseudemys* assumes the common name "Basking Turtles," while the monotypic genus *Chrysemys* assumes the common name "Painted Turtles."

PAGE 14, genus *Chrysemys:* Fahey (1980) proposed that *Chrysemys concinna* be placed in the synonymy of *Chrysemys floridana*. The common name for *C. floridana* remains "Cooter." Fahey (1980) did not address the status of the subspecies of this complex, but acceptance of his proposed synonymy for the two species involved would require careful re-examination of the status of all races currently recognized.

PAGE 18, genus *Anolis:* Schwartz and Thomas (1975) proposed that *Anolis carolinensis* is monotypic. The common name remains the same.

PAGE 28, genus *Elaphe:* Olson (1977) proposed that *Elaphe obsoleta bairdi* be elevated to specific status. The common name remains the same.

PAGE 31, genus *Nerodia:* Blaney and Blaney (1979) proposed that *Nerodia fasciata* be placed in the synonymy of *N. sipedon*. The common name for *N. sipedon* becomes "Banded Water Snake." The common name for the subspecies *N. f. fasciata* (which would become *N. s. fasciata*) becomes "Southern Water Sanke." Schwaner, Dessauer and Landry (1980) disagreed with Blaney and Blaney (1979), and, by inference, proposed that *N. sipedon* and *N. fasciata* be recognized as species, their current status.

PAGE 35, line 13: Rossman (1979) proposed the elimination of the subspecies *Thamnophis elegans biscutatus* on the basis that it represented an intergrade population between *T. e. vagrans* and *T. e. elegans*. Fitch (1980) disagreed with Rossman (1979) and recommended that *T. e. biscutatus* be recognized as a valid subspecies.

PAGE 36, line 5: Benton (1980) proposed the elimination of the subspecies *Thamnophis sirtalis semifasciatus*.

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ARTHUR LOVERIDGE 1891-1980



Arthur Loveridge was one of those rare and exceedingly fortunate persons who are able to spend virtually their entire lives doing what they like best. His life-long enthusiasm for natural history was kindled during his boyhood in South Wales where he was born at Penarth, Glamorganshire, on 28 May 1891, the tenth of eleven children. Like many a lad he caught beetles, pursued butterflies, then graduated to birds, small mammals, and adders, but, unlike most, he soon had a large personal museum that he curated and documented with meticulous care. He attended the University of South Wales, and served on the staffs of the museum at Manchester University and the National Museum of Wales. In 1914 he applied for and received the curatorship of the natural history museum in Nairobi, British East Africa, a position that must have seemed like paradise to a young naturalist. Although he found the collections in chaos, he attacked the problem of setting them in order with vigor and enthusiasm and soon began acquiring a steady stream of new specimens.

In 1915 Loveridge joined the East African Mounted Rifles whose objective was to clear the enemy from neighboring German East Africa. Patriotism may have been a factor, but the campaign also offered an opportunity to be in the field for months at a time and to learn firsthand about the fauna of a fascinating part of the world. His interests immediately became known to his brothers-in-arms, and he was perpetually on call to catch any animal, often a venomous snake, that had invaded someone's tent. He was constantly collecting, plucking beetles from bushes and popping them into his killing bottle even while under enemy sniper fire, bagging reptiles of all kinds, and salvaging a wide variety of wildlife caught or killed in the field or camp. He and his personally trained native helpers often worked far into the night preparing and poisoning (with arsenic) his specimens for later shipment to Nairobi. Through it all he maintained a small zoo, and because of the exigencies necessitated by having to improvise cages from the scant materials at hand, escapes were common and so was the excitement engendered when the truants were found on the prowl. Loveridge's influence was manifested in many ways. A regiment waited while a chameleon was photographed on a rifle; he borrowed the general's car and chauffeur to rescue a collection of preserved snakes from an abandoned German's house; and once he prompted his sergeant to demand, "Is this a war or a blooming museum expedition?"

When the campaign was over he continued his operations in and out of the Nairobi Museum until 1921, when he became an assistant game warden in the former German territory, then called Tanganyika, where he was in the field protecting big game from poachers and was often called upon to trap or gun down lions that had killed or injured tribesmen. He was fearless and no doubt one of the Game Department's most valued employees.

Loveridge was always resourceful, an asset that carried him through numerous tight spots during his many years of field work. An amusing example of his ingenuity occurred when he returned to his base in the far interior and was handed a telegram asking him to be in Mombasa, Kenya, in less than a week to meet his fiancée and be married by her uncle who was coming from Scotland for the occasion. Hurriedly he sought emergency leave, packed his gear and transported it halfway across Tanganyika by rail, and then caught the twice-weekly train to Dar es Salaam on the coast. The ship he had hoped to board had left an hour before his arrival and another was not due for a fortnight. Nothing daunted he virtually commandeered a sailing dhow to take him to the island of Zanzibar, fifty miles away, where ocean-going vessels were more apt to call. He rounded up the score of passengers who had not expected to leave until the following day, expedited their passage through the local health and other official formalities, and hired a tug to tow the dhow through the winding harbor channel to open water. With sails set, progress was excellent at first, but they were soon becalmed on the wrong side of Zanzibar. Loveridge talked the captain into having him rowed ashore where he hiked through a downpour to the nearest telephone, summoned a taxi, and soothed the customs officer who was perturbed by his unauthorized landing. Such singleness of purpose deserved its reward. A French liner arrived unexpectedly the next day and Loveridge landed at Mombasa in ample time to wed his fiancée, Mary Sloan, whom he affectionately called Queenie.

In 1924 the Loveridges and their small son sailed for the United States where Arthur became associated with Harvard's Museum of Comparative Zoology, and where he served with distinction until his retirement in June, 1957. He not only curated the large collection Thomas Barbour had assembled, but he added impressively to it on his own, chiefly as the result of five long expeditions he made during the period from 1926 to 1949, inclusive, to the forested regions of East Africa in (by their names at the time) Kenya, Nyasaland, Tanganyika, Tete in Mozambique, and Uganda. Mrs. Loveridge and their son, Brian, accompanied him on some of those trips, reports about which appeared in bulletins of the Museum of Comparative Zoology.

Loveridge was a prolific scientific writer, and he published approximately 180 herpetological papers, the last of which appeared in 1979. Among them were an important series of taxonomic revisions of African genera and families and a check list of the amphibians and reptiles of East Africa. Harvard University Press published a bibliography of his contributions (1913-1936, 1937-1944, 1944-1950), and he continued the list (1951-1958, 1958-1977) privately, the printing being done on St. Helena Island.

Unlike many professional zoologists who

consider it infradig to impart their knowledge to the lay public, Loveridge was a skillful popular writer. He began by submitting short articles to natural history magazines. Later he wrote a series of highly readable books variously titled "Many Happy Days I've Squandered," "Tomorrow's a Holiday," "I Drank the Zambezi," and "Forest Safari," which were filled with wry humor, and even the most hair-raising experiences were recounted with no attempt at the dramatic.

Loveridge and his "Queenie" retired to the island of St. Helena in the South Atlantic Ocean in 1957, where he remained active, publishing a number of short notes about local wildlife and completing several longer contributions. He also conducted a vast correspondence with friends and colleagues, with each letter logged by number; the last one mailed to me, in late 1979, was No. 6812! Because we were both good correspondents, I learned to know Loveridge better when he was far away than when he had been at Harvard. We kept each other informed about our activities, we waxed philosophical at times, and I, fortunately, was able to find the various references he needed and to answer his many questions. Also, in support of a hobby that began when he was a boy, I sent him a steady flow of postage stamps from my incoming mail, adding as many stamps as possible to each letter without exceeding the weight allowed by the post office.

He made a number of trips to England during his long retirement and, because St. Helena is a volcanic peak with no room for an airport, passage was by motorship. Sailings by the two vessels which touched at St. Helena were at infrequent intervals, and once he had a lengthy delay in Britain, waiting for a return passage, after one of the ships sustained a severe fire at sea and the passengers were forced to take to the lifeboats.

Despite all the "roughing it" that Arthur Loveridge did during so many decades, he remained the proper Englishman with his professional colleagues. I well recall that, at a small farewell luncheon at Harvard, he announced the time had come for us to drop formality. "Hereafter," he said, "I'm going to call you Conant." And so it was for many years until we imperceptibly switched to a first name basis.

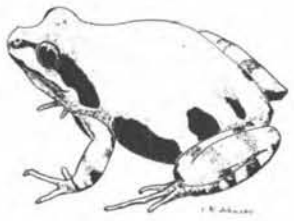
Mrs. Loveridge died suddenly in June, 1972, after picking vegetables in their garden. Four years later Brian moved to St. Helena to be with his father.

Loveridge's mind remained clear almost until the day of his death. Just a few months previously he announced his discovery that two names, used by entomologists, one for a family and another for a genus, were identical with or very similar to names long employed by herpetologists. He asked me if I would like to appeal to the International Commission on Zoological Nomenclature for a decision to emend the duplication. I turned the problem over to Hobart M. Smith who is following through and using Loveridge's name as co-author.

Arthur Loveridge accomplished much during his long life. He saw Africa when it was far more primitive than it is today and recorded innumerable facts for posterity. Few other persons of his generation collected and carefully preserved as much museum material as he did. His knowledge was truly phenomenal and, although he concentrated in the field on reptiles and amphibians, his contributions, in the way of specimens, to other disciplines were substantial. He was a quiet, humble gentleman who was always friendly, cooperative, and thoughtful. He favored me with copies of his papers, even when he had few to distribute, because he felt they might be useful to a zoo curator who would be expected to identify specimens from Africa that might arrive unexpectedly. They did indeed, before the rules were changed and nothing could be imported without a permit.

Loveridge's visits to England were memorable events to his many friends and relatives who eagerly looked forward to seeing him and enjoying his cheerful presence. He was a highly respected friend and naturalist who is mourned by many. He died in the St. Helena General Hospital on 16 February 1980 after a short illness at the age of almost 89.

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FIRST REPTILE BREEDING CERTIFICATE NOMINATIONS RECEIVED

Nominations have been submitted to the AAZPA Honors and Awards Committee from the institutions listed below for recognition as the first zoological facility in North America to have bred the designated species in captivity:

Woodland Park Zoological Gardens
Osteopelus dominicanus, January 1978
Oklahoma City Zoo
Lampropeltis getulus nigritus, 7 August 1975; *Chelodina longicollis*, 21 April 1975
Dallas Zoo
Crotalus adamanteus, 1 August 1973; *Platysaurus intermedius*, 1 January 1978; *Crotalus atrox*, 23 July 1973; *Bothrops nigroviridis aurifer*, 11 March 1977; *Crotalus pricei pricei*, 4 June 1979; *Sceloporus cyanogenys*, 10 June 1978; *Lampropeltis zonata pulchra*, 30 June 1978; *Epicrates fordi fordi*, 20 July 1973; *Cnemidophorus tigris*, September 1978; *Crotalus pusillus*, 23 January 1974; *Crotalus durissus culminatus*, 28 October 1979; *Trimeresurus popeourum*, 1 April 1977; *Bothrops neuwiedi*, 2 April 1978; *Lampropeltis triangulum sinaloae*, 18 June 1978; *Liasis childreni*, 31 May 1978; *Epicrates angulifer*, 11 November 1975; *Elaphe bairdi*, 28 July 1975; *Elaphe obsoleta lindheimeri*, September 1977; *Crotalus mitchelli stephensi*, 8 August 1978; *Pachydactylus bibroni*, 28 March 1977; *Bothrops nummifer occidduus*, 23 January 1979; *Varanus prasinus kordensis*, 4 October 1978; *Crotalus durissus cumanensis*, 30 June 1979; *Bothrops godmani*, 26 November 1977; *Crotalus triseriatus aquilus*, 26 July 1977; *Crotalus mitchelli mitchelli*, 28 June 1976; *Lampropeltis triangulum amaura*, 11 March 1977; *Crotalus molossus nigrescens*, 9 June 1975; *Varanus gilleni*, 17 May 1978; *Crotalus lepidus morulus*, 30 June 1979; *Liasis mackloti*, 22 June 1979; *Callisaurus draconoides*, 1 August 1978; *Python timoriensis*, 22 September 1975; *Liasis boa*, 5 August 1978; *Terrapene coahuila*, September 1979; *Aspidites melanocephalus*, 16 June 1979; *Sceloporus orcutti*, 18 July 1978; *Lampropeltis triangulum arcifera*, 22 July 1975; *Crotalus ruber lucasensis*, 9 November 1979; *Candoia bibroni*, 22 August 1978

Challenges to these nominations are to be submitted to the AAZPA Honors and Awards Committee, Steve Wylie, Chairman, St. Louis Zoological Park, Forest Park, St. Louis, MO 63110 with appropriate documentation of prior captive breeding anywhere in North America.

....AAZPA Newsletter 21(8):1980.

FEDERAL REGULATIONS FOR THE IMPORTATION OF ANTIVENIN

There appears to be some confusion among AAZPA institutions in regard to the proper method for importing antivenins.

Two Federal Agencies are involved in the importation of antivenin, namely the Department of Health and Human Services, and the Department of Agriculture.

The Department of Health and Human Services requires an Investigational New Drug filing to permit the importation of snake antivenins into this country.

Such antivenins for human use are subject to Section 262 of Title 42 of the U.S. Code which prohibits the sending, carrying, or bringing for sale, barter, or exchange from any State or possession into any other State or possession or from any foreign country into any State or possession any biologic product unless manufactured at an establishment holding an unsuspended and unrevoked license issued by the Secretary of Health and Human Services.

The antivenin products you wish to import have not been prepared at a U.S. licensed establishment nor have any licenses been

issued to any manufacturer for such products.

Since zoos and possibly a few other institutions maintain species of snakes for which no licensed antivenin products are available, they recognize the importance for such institutions to have antivenins available in the event someone is bitten by a snake. They therefore will permit importation provided the zoo's physician or its medical consultant will submit the following information to the Director, Bureau of Biologics as an Investigational New Drug application (IND):

1. The name of each product, the name and address of the manufacturer, the type of snake(s) against whose venom the antivenin is claimed to be effective and, when available, the lot numbers(s) of the product, together with a statement by the manufacturer that the antivenin has passed the applicable safety and sterility tests. One method of accomplishing this is by having the statement typed across the invoice sheet. The lot number and safety and sterility test results can be submitted upon receipt of the antivenin.
2. A statement that the antivenin is being imported solely as an emergency measure in the event that an employee of the institution is bitten and that the product will not be resold.
3. A statement that the antivenin will be maintained under the physician's control and only administered under his supervision.
4. A statement to the effect that, in the event such product is administered, a complete case report will be submitted to this Bureau.

Upon receipt of the above information, appropriate steps will be taken to assist in clearing the material through customs.

If additional information is required please contact:

Harry M. Meyer, Jr., M.D.
Director
Bureau of Biologics
Food and Drug Administration
8800 Rockville Pike
Bethesda, MD 20205

The Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) requires that two copies of Veterinary Services Form 16-3 (Application For Veterinary Permit To Import Or Transport Organisms Or Vectors) be submitted to its Hyattsville, Maryland office. The reason for this is the equine origin of antivenins. Upon approval of the permit application, APHIS will issue the importing institution a red tag(s) which you in turn send to the foreign manufacturer to be affixed to the package prior to shipment to the United States.

SUMMARY OF STEPS TO BE TAKEN WHEN IMPORTING ANTIVENIN

A. Apply to Bureau of Biologics for an institutional BB-IND number. This number is ongoing and the foreign manufacturers should include it on all shipping labels.
B. Request permission from the Bureau of Biologics for each separate importation, submitting to them the information required in numbers one through four above. Remember your BB-IND number is ongoing and should appear on all correspondence to the Bureau.
C. Upon each importation, apply to APHIS for a permit to import antivenin, and when permit is approved send red tag(s) to foreign manufacturer prior to shipment of product.

Finally, it is important to remember that, in the event any foreign antivenin is used clinically, a complete case report must be submitted to the Bureau of Biologics.

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....AAZPA Newsletter 21(8):1980.

A BICEPHALIC *CROTALUS HORRIDUS* FROM ALABAMA

A two-headed timber rattlesnake *(Crotalus horridus)* was born in captivity on October 24, 1978 (Figure 1). The adult female was collected in Bullock County, Alabama during the Spring of 1978. The litter consisted of five fully developed young and three undeveloped (infertile) eggs. Two of the young, including the bicephalic specimen, were dead when discovered in the cage. One has subsequently died, while the remaining two are alive at the time of this writing.

Klauber (1956) cited reports of the occurrence of bicephaly in several species of rattlesnakes including *C. b. basiliscus, C. d. terrificus, C. v. oreganus, C. v. viridis, C. horridus, C. adamanteus,* and what he believed was a *C. s. scutulatus* plus several others in which the rattlesnake was not identified. Murphy and Shadduck (1978) recorded a bicephalic *C. adamanteus* born to a female from the mating of a captive pair. They also reported accounts of the condition in *Sistrurus m. streckeri, C. atrox* and a "swamp rattlesnake" from Wisconsin.



Figure 1. A bicephalic *Crotalus horridus atricaudatus* born in captivity to a wild caught female from Bullock County, Alabama in 1978.



Figure 2. Dorsal view of the anterior portion of a bicephalic *C. h. atricaudatus* from Alabama.

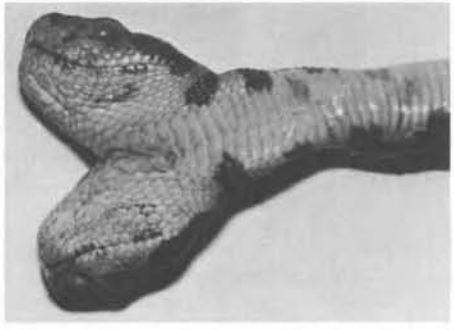


Figure 3. Ventral view of the anterior portion of a bicephalic *C. h. atricaudatus* from Alabama.

The two-headed specimen reported here is joined just behind the most posterior labials, at the angle of the jaw, leaving the two mouths independently functional (Figure 2). Ventrally, the connection is at the first ventral scute (Figure 3).

Except for the absence of the left eye on the right head (Figure 1 and 2), a condition also observed in one of the snake's siblings, both heads appear to be normal.

This individual is a 260 mm male with 23 scale rows at midbody. Other counts were: ventrals 169; subcaudals 25; supralabials, right head 14-12, left head 14-13; infralabials, right head 16-15, left head 16-15. Where two numbers are given, the first is for the right side of the head.

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AN INSTANCE OF NATURAL CANNIBALISM BY *UMA N. NOTATA* BAIRD

Numerous articles have been published describing cannibalism by many species of lizards in both field and cage environments. Most concern members of the Family Iguanidae (Bowie, 1973; Burt, 1928; Carpenter, 1963; Grove, 1971; Johnson, 1965; Kennedy, 1956; Knowlton, 1934; Knowlton and Thomas, 1934; Montanucci, 1965; Mosley, 1963; Shaw, 1950; Smith and Fritts, 1969), though the Scincidae (Douglas, 1965) and Varanidae (Burden, 1928; Johnson, 1976) were also noted as cannibalistic. In general, these lizards can be described as aggressive predatory animals. The number of references and the diverse species indicates to us that cannibalism is not an aberrant isolated occurrence in lizard populations. We present here another instance of cannibalism by a free-living lizard.

At about 12:30 p.m. on April 12, 1971, a clear, calm day, the senior author and his brother found a sidewinder, *Crotalus cerastes*, which was biting an adult *Uma notata notata* by the base of the tail. The snake released the lizard, which died a few hours later, and retreated down a hole at the base of a bush. The location is in the Algodones Dunes about 13½ road miles east of the intersection of California Highways 111 and 78 in Brawley, Imperial County, California. Only the lizard was collected.

Prior to skeletonizing the lizard, the junior author opened the body cavity to determine sex. On probing the viscera, a conspecific juvenile was found in the esophagus. The adult was a male with a snout to vent length of 100 mm, and the juvenile was also a male with a snout to vent length of 51 mm. The smaller one had been swallowed head first; it was virtually intact, missing patches of skin from the top of its head and shoulders, and it had numerous adherent sand grains. Both have been skeletonized and are in the junior author's disarticulated skeleton collection.

Carpenter (1963) reported that *Uma* ate conspecific juveniles. Shaw (1950) observed that *Uma n. notata* captured in Imperial County, as was our specimen, were cannibalistic in an enclosure. Animals approximately the same size as our animal ate juveniles about one-half their size. According to Shaw, the prey was normally seized head first, its skull crushed by repeated chewing and then ingested head first. The anterior abrasions on our juvenile animal indicate that it was probably captured and ingested as described above.

Fox (1975) described cannibalism as intraspecific predation that should be thought of as a normal phenomenon occurring in many natural populations as well as in the laboratory. According to Fox (1975), fishes, anurans, birds, mammals and many invertebrate species exhibit cannibalism. In natural populations, cannibalism could offer a number of advantages for a predator by eliminating a potential competitor for natural resources. Therefore, in lizards cannibalism could be a mechanism for stabilizing a population and reducing competition.

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VOCALIZATIONS BY THE MEXICAN HYLID FROG *HYLA TAENIOPUS*

Duellman (1970) stated that: "*Hyla taeniopus* has not been heard to call in the field; recordings of the call are not available. One individual kept in captivity uttered one loud groan-like note. On the basis of this one observation and the presence of vocal slits, it may be assumed that this species does possess a voice. However, the significance of the voice in mating behavior is quite questionable."

Consequently the following observations are of some interest:

30 January 1977, 2:00 A.M. A captive male *Hyla taeniopus* collected the previous spring near Tezuitlan, Puebla, Mexico, gave a series of 10 sequences of calls that I describe as a nasal "wan wan wan", etc. Each sequence was 2-3 seconds in length and all were given in a period of one minute. Further calls were heard on 23 February 1977 (9:30 A.M.), 24 February 1977 (4:45 A.M.), 28 February 1977 (8:50 A.M.) and 13 March 1977 (8:30 A.M.).

I have maintained the *Hyla taeniopus* in captivity since 14 April 1976, and the calls described above are the only ones of that type heard since that time. The period during which they were given coincides closely with the breeding season for the frog as suggested by Duellman (1970), who believed breeding occurs from December through February. Thus, it is possible that this call functions as a mating call.

On 21 March 1977, another type of vocalization was given by the tree frog. The call was given when I picked the frog up by the waist. This call was similar to the "wan wan" call but lower in volume, and may function as a releaser to discourage other male frogs from attempting amplexus.

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Plethodon ouachitae X *P. fourchensis* hybrid collected Arkansas: Polk Co.: west end of Fourche Mountain, northeast of Eagleton — April, 1979. Collected by Stanley E. Trauth, Biology Dept., Georgia Southwestern College, Americus, GA 31709. ●

A LARGE EGG CLUTCH FROM AN EASTERN HOGNOSE SNAKE, *HETERODON PLATYRHINOS*

On 19 June, 1979, an eastern hognose *(Heterodon platyrhinos)* at the Cincinnati Museum of Natural History laid 49 eggs, an unusually large number for the species.

The mother had been caught about dusk on 14 May, 1979, near the westernmost edge of Cincinnati, Hamilton County, Ohio. Her length at the time of laying was 0.97m.

The last egg was laid about 9 A.M. The following measurements were completed within one-half hour after the last egg was laid; they are listed in order from maximum length to minimum length, the order of laying being unknown:

	Length (cm)	Diameter (cm)
1)	3.70	1.97
2)	3.60	2.11
3)	3.60	2.02
4)	3.60	1.98
5)	3.58	2.12
6)	3.55	2.01
7)	3.53	2.12
8)	3.53	1.99
9)	3.51	2.06
10)	3.50	1.99
11)	3.49	2.15 (max. D)
12)	3.47	1.97
13)	3.44	2.05
14)	3.41	2.02
15)	3.40	2.10
16)	3.40	2.02
17)	3.40	1.94
18)	3.39	2.13
19)	3.38	2.07
20)	3.36	2.09
21)	3.36	2.07
22)	3.35	2.08
23)	3.35	2.05
24)	3.34	2.01
25)	3.34	2.00
26)	3.33	2.00
27)	3.32	2.12
28)	3.32	2.08
29)	3.32	2.08
30)	3.32	2.05
31)	3.32	2.04
32)	3.32	2.03
33)	3.32	2.02
34)	3.30	2.05
35)	3.29	2.04
36)	3.29	1.99
37)	3.29	1.98
38)	3.28	2.03
39)	3.28	2.00
40)	3.28	1.91 (min. D)
41)	3.27	1.96
42)	3.27	1.92
43)	3.26	1.95
44)	3.25	1.93
45)	3.23	2.03
46)	3.23	2.00
47)	3.16	2.14
48)	3.15	2.04
49)	3.15	1.98
average	3.37	2.03

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HANDLER BEWARE! LARGE CONSTRICTORS CAN KILL!

On 19 September, 1978, an amateur herpetologist in Florence, Kentucky, was killed by a python from his collection. The main purpose of this note is to reëmphasize the danger inherent in the handling of large constricting snakes.

The data presented here came from five sources: Donald W. Stith, the Coroner of Boone County, Kentucky; Dr. Robert J. Ritterhoff, the Deputy Coroner of Hamilton County, Ohio; the wife and son of the victim; members of the Greater Cincinnati Herpetological Society who cared for the victim's animals after the misfortune; and personal observations as one of those members.

The victim was a well-developed, well-nourished, male Caucasian aged 33. He was nearly 1.7 m tall and weighed about 77kg. At the time of death, he had not been under any physician's care for a considerable period, nor did he seem to have had any reason to have been. He had been handling reptiles for at least four or five years, was a member of the Greater Cincinnati Herpetological Society, and was known locally as a person who did a good job of giving reptile programs to school groups, Scout troops, *etc.*

The snake was a female reticulated python, *Python reticulatus* (Schneider, 1801), nearly 4m long, 37cm in girth, and about 23kg in weight. The snake had been in the victim's possession for about one year. It was housed with a slightly larger female of the same species in a cage 1.2 x 2.4m by 1.2m high; one long side of the cage consisted of two sliding glass doors.

When last seen by his spouse, the victim was preparing to feed some of his animals. As she walked up the stairs out of the basement, he was opening a cage containing Burmese pythons and other snakes. To free his hands he had tucked a dead rabbit under his chin.

A while later, the victim's family heard a crash downstairs, but the basement was cluttered, and crashes weren't at all unusual when someone was down there. Some time later, (five or ten minutes?) they noticed they'd heard nothing for a while. When the basement door was opened, the victim was found collapsed on the landing with the snake wrapped around his neck, shoulders, and upper arms. The victim's wife unwrapped the snake, which offered little resistance, but attempts to revive the victim were in vain. He was pronounced dead at 11 P.M., death apparently having occurred at about 10:25.

The coroner was called at 10:50 P.M. When he arrived, the neck of the victim was distinctly white; the face from the chin up was red; the trunk was of normal color. There was bleeding from the right ear, but not the left, and there had been capillaries burst in the whites of the eyes.

An autopsy was performed the next day by the Deputy Coroner of Hamilton County, Ohio, who is a physician. (Kentucky law does not require that coroners be physicians, and the Boone County Coroner is not one.)

The post-mortem revealed no evidence of heart failure, stroke, *etc.*, which might have caused death. There was no ethyl alcohol in the blood. There was no sign of any debilitating injuries, a blow on the head, for example.

The only wounds on the body were one small mark on the throat and some abrasions on the back of the right hand. On the photographs of the victim, none of these wounds appears to be from snake-bite. The victim's thyroid and hyoid cartilages were intact.

The death certificate lists death as accidental and due to asphyxia as a result of neck constriction by a python snake.

In conclusion, I would like to warn handlers of large constricting snakes to guard against over-confidence in dealing with these animals. No matter how much of a "he-man" you are, don't handle large snakes alone. Perhaps even more important, those in the education profession should take special care to alert would-be and novice snake handlers of the potential dangers of large constrictors.

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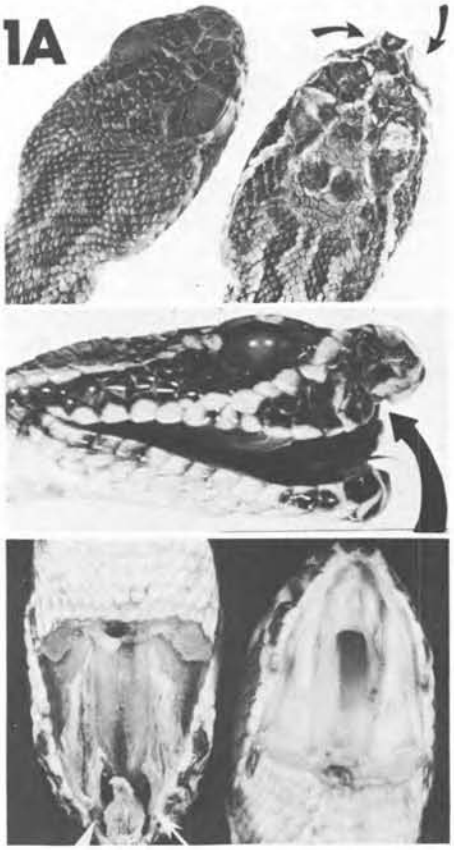
BILATERAL CLEFT LABIAL AND PALATE IN THE PROGENY OF A *CROTALUS VIRIDIS VIRIDIS* RAFINESQUE

In October, 1978, a wild-bred prairie rattlesnake *(Crotalus viridis viridis)* from the Missouri Breaks region of Northern Montana gave birth to seven siblings, all females. Although morphologically normal in all other external features, bilateral cleft labial and cleft palate was present in six of the seven siblings (Figure 1). The single specimen with normal labials and palate was stillborn. The six females with cleft labial and palate moulted in 7-10 days and continually refused to feed on newborn mice. The specimens were sacrificed at 29 days postpartum and catalogued at the Brigham Young University Life Sciences Museum (#33191-7). The parental female died six days postpartum (respiratory infection).

Each specimen was examined grossly and microscopically at 6x to 32x magnification. All six malformed snakes exhibited similar morphological defects. Each palate was deeply indented and the clefts extended from the anterior margin of the nasal opening, lateral to the rostral, to the internal nares which appeared normal. Each lateral nasal process was bilaterally cleaved giving the appearance of an exaggerated frontonasal area (Figure 1A). The bilateral clefts extended along the entire length of the nasal sacs, passing between the maxilla and the anterior palatine laterally, and the premaxilla and vomer medially. Head width appeared slightly broader, possibly due to the unfused palates. The morphological defects in these speci-

mens appeared similar to defects previously described by Bellairs and Boyd (1957) in *Eunectes murinus* embryos.

Facial clefts are major human congenital malformations and have been investigated extensively as to their etiology (review by Shapiro, 1976). Cleft lip, cleft palate and/or cleft lip combined with cleft palate has also been studied in experimental animals, principally dogs (see Cooper and Mattern, 1971). The three major factors contributing to cleft anomalies seem to be gross chromosomal anomalies, single gene traits and environmental teratogens (Shapiro, 1976; Fogh-Anderson, 1971).



We have no conclusive evidence as to the etiology of this high incidence of cleft anomalies. However, the parental female was the sole survivor of 23 gravid *C. viridis viridis* received June 8, 1978 from the Montana Rattlesnake Company, Wilsall, Montana. These gravid adults had been previously housed communally for four weeks and respiratory infections were obvious (at necropsy) in 21 of the 23 specimens. They also had been electronically stimulated (for venom extraction) an unknown number of times during the initial stages of embryonic development (May). These circumstances provide at least "suggestive", although certainly inconclusive, teratogenic etiology.

We believe this anomaly to be rare in *adult* reptiles. The literature on reptilian cleft labial and/or palate is scant. The only report we found is that by Bellairs and Boyd (1957). Many reptiles are chemically "cued" to food prey items through nasal or vomeronasal stimulation. These necessary processes are possibly disrupted by the cleft abnormalities thereby limiting the number of cleft specimens attaining adulthood. Also, since both cartilaginous nasal capsules are deficient, exposing the nasopalatine ducts and oral cavity internally, the specimens are likely susceptible to bacterial infections.

Bellairs spoke on the subject of reptilian clefts in his keynote address at the Joint Herpetology Conference, Tempe, Arizona (1978). He requested that the herpetological community become aware of the lack of information regarding this unique anomaly in reptiles and suggested that all occurrences be communicated to the literature. This report is submitted with Bellairs's comments in mind.

ACKNOWLEDGMENTS

This work was supported by the Veterans Administration Medical Research Program and the Utah Zoological Society. The photographs were taken by Carl Henderson, Learning Resources Division, VA Medical Center. We are also grateful for the advice of J. Cervenka, Oral Pathologist, Dental School, University of Minnesota.

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SSAR GRANTS-IN-HERPETOLOGY

The Society for the Study of Amphibians and Reptiles is pleased to announce that proposals are now being accepted for the 1981 Grants-In-Herpetology Program. This program is designed to provide financial support to deserving individuals or organizations engaged in research on or conservation of amphibians and reptiles. Grant proposals will be considered in the following areas:

1) **HERPETOLOGY-ORIENTED CONSERVATION.** Proposals should address research on endangered or threatened species at the state, national or international levels, or address research on critical herpetological habitats. Proposals may be received from individuals only.

2) **GRADUATE STUDENT HERPETOLOGICAL RESEARCH.** Proposals may address any herpetological research endeavor and may be submitted by individual graduate students only, with a letter of support from the student's major advisor or committee chairperson.

3) **REGIONAL HERPETOLOGICAL SOCIETY PROGRAMS OR PROJECTS.** Proposals may address any herpetological research endeavor or project, provided said endeavor or project concerns herpetology within the implied geographic limits of the regional society. Proposals may be submitted by regional herpetological societies or by individuals. If the latter, a sponsoring letter from the current societal president or an advisor should accompany the proposal.

4) **HERPETOLOGICAL RESEARCH IN ZOOS.** Proposals may address any herpetological research endeavor which is conducted at a zoo. A letter from the represented zoo or supporting institution should accompany the proposal.

Each proposal should include the following information: A) **Background & Objectives** of the proposed project, in terms of its relevance to herpetology, B) **Methods** of carrying out the research or conducting the project, C) **Budget** for the project, according to the guidelines set forth below, and D) **Letter of Support** (if applicable). Proposals should be relatively brief (approx. 5 typed pages).

Budgets for the proposals should not exceed **$250** in each category. The budget request should specifically relate to the project under consideration.

Successful applicants will be expected to submit to SSAR a written report of the results of their research or project, within a reasonable time after the project year is completed. They are also encouraged to submit for publication the results of their research or project, preferably to **The Journal of Herpetology** or **Herpetological Review.**

Members of the SSAR Grants-In-Herpetology Committee will evaluate all proposals, projects or programs. Committee members are: Martin J. Rosenberg (Chairperson), Douglas Fraser (Regional Herpetological Societies), Terry Graham (Conservation), John Groves (Zoo Research) and Linda Maxon (Graduate Student Research).

Individuals submitting proposals should designate to which of the four areas their proposal applies. All proposals must be typewritten and submitted in duplicate no later than **15 APRIL 1981** to:

Martin J. Rosenberg
Department of Biology
Case Western Reserve University
Cleveland, Ohio 44106

EARTHWORM *(LUMBRICUS TERRESTRIS)* CONSUMPTION IN CAPTIVE GARTER SNAKES *(THAMNOPHIS SIRTALIS)*

Earthworms are a major food for wild garter snakes, *Thamnophis sirtalis*, (Fitch, 1965) and may be used as food for snakes under laboratory conditions (UFAW, 1967). This study reports the consumption of earthworms *(Lumbricus terrestris)* as the only food for two captive garter snakes over a six year period.

Two garter snakes (1 female, 1 male) were captured in Hunterdon County, New Jersey in 1971. They were housed in a glass and metal frame vivarium (51 x 31 x 28 cm) with a screen top in a room maintained at a temperature of 20 ± 5° C. The floor of the vivarium was covered with gravel, this was removed periodically, the vivarium cleaned and new gravel added. A container of dechlorinated tap water was available at all times. The snakes were fed from approximately April until food refusal occurred (usually October) and were offered earthworms at about 10 day intervals. They were allowed to consume as many earthworms as desired at each feeding.

The results of this study are given in Table 1. The female ate a mean of 5.3 earthworms and the male a mean of 3.8 earthworms at each feeding. During this six year period the female grew 13 cm and the male 9 cm. One litter of 6 was born in 1972.

LITERATURE CITED

Fitch, H. S. 1965. An ecological study of the garter snake, *Thamnophis sirtalis*. Univ. Kans. Pub. Mus. Nat. Hist. 15(10):493-564.

The Universities Federation of Animal Welfare. 1967. Handbook on the care and management of laboratory animals, 3rd ed. E. & S. Livingstone, Ltd.

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Table 1. Number of earthworms *(Lumbricus terrestris)*, consumed, number of feeding days, total length and number of sheddings of garter snakes *(Thamnophis sirtalis)*.

Year	No. of earthworms consumed		No. of feeding days		Total length (cm)		No. of sheddings	
	female	male	female	male	female	male	female	male
1972	49	46	158	123	70	59	3	4
1973	113	47	177	115	74	61	3	3
1974	78	48	163	112	77	63	2	2
1975	107	63	228	237	80	64	2	3
1976	107	70	171	171	83	66	3	3
1977	106	71	159	159	83	68	2	3

MUSEUM ACRONYMS* - SECOND EDITION

A preliminary or first edition of a list of museum acronyms was published in **Herpetological Review** in 1978 (vol. 9, no. 1, pp. 5-9). The list was compiled by the members of the Electronic Data Processing Subcommittee of the Joint Herpetological Resources Committee (a committee sponsored by the American Society of Ichthyologists and Herpetologists, Herpetologists' League, and the Society for the Study of Amphibians and Reptiles). The criteria for assigning acronyms for each of the cited collections were given in the introductory statement, and those criteria were followed in preparing this second edition. When the first list was published, users were asked to send their comments, corrections, emendations, and suggestions for additions and deletions to the chairman of the subcommittee. Many did so, and their responses have been individually and critically reviewed. Where there have been conflicts among the recommendations of two or more respondents, choices had to be made, and in these cases the committee accepts full responsibility for having so chosen.

In the first edition of the acronym list, a number of private collections were cited. Private collections have been omitted from the second edition. In the opinion of the committee, although a few private collections are frequently cited in the literature, those of importance are ultimately deposited in recognized institutional collections, and the committee did not want to otherwise encourage the proliferation of non-institutional collections by those seeking to have a private acronym designation. Also, in the first edition several institutions were listed whose collections had previously been transferred to other administrative agencies (i. e. other institutions) for permanent care. These institutions have been culled from the present list inasmuch as the committee members did not feel that the present list need accommodate an historical review of all acronyms, past and present, that have appeared in the literature.

The second edition of the acronym list should be treated as the penultimate step in the construction of a set of alpha-codes for the citation of museum specimens both in the literature and in electronic data processing. Again, users are encouraged to send suggestions for revisions to a member of the Joint Herpetological Resource Committee (see below) for review. This acronym list will be enlarged to include ichthyological collections not co-located at institutions having herpetological collections as well. Thus, a third edition may be expected incorporating minimal changes to the present list, save for obvious errors and additions and/or deletions to the list of herpetological collections.

Clearly this list is not binding on the users. However, hopefully its adoption will result in the standardization of coded collection names, reducing the proliferation of multiple acronyms for given collections, a not uncommon occurrence in past and recent literature.

The committee members thank those who took time to review the first edition of the acronym list and who sent their comments to the committee. Further, to the members of the earlier subcommittee who have not participated in the present update, Drs. William Duellman, C. J. McCoy, and Tom Fritts, the members of the present committee wish to express their appreciation for having done the pioneer work, which made the compilation of the second edition an order of magnitude easier. Dr. Michele Aldrich helped proofread the final version of this list; finding numerous glitches which had escaped the notice of the compilers, her attention contributed to a marked improvement in the published copy.

Should users wish to comment on this list, please address your remarks to the chairman, or to any committee member if otherwise convenient.

For the Joint Herpetological Resource Committee:
Alan E. Leviton, Chairman (CAS)
Roy McDiarmid (USNM)
Scott Moody (OUVC)
Max Nickerson (MPM)
Jose Rosado (MCZ)
Otto Sokol (USA)
Harold Voris (FMNH)

* Two respondents criticised the use of the term "acronym" for the alpha-code names for the collections. The term "eponym" was suggested by one of the two. While neither seems entirely suitable, "eponym" does appear more applicable in this case. However, the word "acronym" is retained in the title of the second edition pending a more thorough etymological review of the options available.

SECTION I
COLLECTION ACRONYMS - ALPHABETICAL LISTING

Acronym	Record #	Institution
ALA	001	University of Alabama
AM	002	Australian Museum
AMG	003	Albany Museum
AMNH	004	American Museum of Natural History
ANSP	005	Academy of Natural Sciences, Philadelphia
ANU	006	Australian National University
ANWC	042	Australian National Wildlife Collection
APSU	007	Austin Peay State University
ARK	008	University of Arkansas
ASSL	009	Academy of Science of St. Louis
ASU	010	Arizona State University
AUM	011	Auburn University
BIUB	182	Mongolian Academy of Sciences
BM	012	British Museum (Natural History)
BMBN	013	Bergen Museum
BNHM	014	Bombay Natural History Museum
BNHS	015	Bombay Natural History Society
BPBM	016	Bernice P. Bishop Museum
BYU	017	Brigham Young University
CA	018	Chicago Academy of Sciences
CAM	043	Central Australian Museum
CAS	019	California Academy of Sciences
CCB	020	Central College, Bangalore
CHINM	021	Instituto Nacional de Microbiologia
CHM	022	Charleston Museum
CM	023	Carnegie Museum
COM	024	Colombo Museum
CPS	025	University of Puget Sound
CRE	026	University of Southern California
CSTC	027	Colorado State Teachers College
CU	028	Cornell University
CUB	029	Chulalongkorn University
CWS	031	Central Washington State College
CZL	030	Centro de Zoologia
DMD	033	Durban Museum
DMNH	034	Dallas Museum of Natural History
DSP	035	Fitzsimons' Snake Park
DZVU	036	Universidad de Uruguay
EBRG	037	Estacion Biologia de Rancho Grande
ECNB	038	Escuela Nacional Ciencias
EI	039	Universidade Federal Rural, Eugenio Izecksohn
EPN	040	Escuela Politécnica Nacional
FML	055	Instituto Fundacion Miguel Lillo
FMNH	041	Field Museum of Natural History
FSM	044	University of Florida, Florida State Museum
FWM	045	Fort Worth Museum of Science and History
GML	046	Gorgas Memorial Laboratory
HUJ	049	Hebrew University
IB	050	Instituto Butantan
IBMUNC	051	Universidad Nacional de Cuyo
ICN	052	Universidad Nacional de Bogota
IFAN	053	Instituto Fondamental d'Afrique Noire
IM	054	Indian Museum
INHS	056	Illinois Natural History Survey
IOC	057	Instituto Oswaldo Cruz
IPN	058	Instituto Politécnico Nacional
IZAC	059	Academia de Ciencias, Havana
IZUA	060	Universidad Austral
IZUC	061	Universidad de Concepcion
IZUCS	062	Universita di Cagliari
JFBM	063	James Ford Bell Museum of Natural History
KM	064	Krakow Museum
KMK	065	Kaffarian Museum
KNP	066	Kruger National Park
KU	067	University of Kansas
LACM	068	Los Angeles County Museum of Natural History
LCFM	069	Musée La-Chaux-de-Fond
LIHUBA	070	Universidad de Buenos Aires
LIVCM	277	Merseyside County Museums
LMB	071	Landsmuseum Brun
LMM	072	Alvaro de Castro
LNK	278	Landessammlungen fuer Naturkunde
LSUMZ	074	Louisiana State University, Baton Rouge
LSUS	073	Louisiana State University, Shreveport
MA	075	Awash National Park
MACN	076	Museo Argentino de Ciencias Naturales
MAD	077	Madras Museum
MBL	078	Universidade Lisboa
MBUCV	079	Universidad Central, Caracas
MBZH	080	Museo y Biblioteca de la Zoologia, Havana
MCNC	081	Museo de Ciencias Naturales, Caracas
MCZ	082	Harvard University
MD	083	Museu do Dundo
MDUG	084	Universidad Guanajuato
MFP	085	Museo Felipe Poey
MGAB	086	Museu "Gross Antipa"
MHNB	087	Museum d'Histoire Naturelle, Bale
MHNG	088	Museum d'Histoire Naturelle, Geneve
MHNJP	089	Universidad Nacional Mayor de San Marcos
MHNL	090	Museu do Historia Naturale, Lisbon
MHNLS	091	Museo de Historia Natural La Salle
MHNM	092	Museo de Historia Natural de Montevideo
MHNV	093	Museo de Historia Natural de Valpariso
ML	094	Prirodosloveni Muzej Slovenije
MLP	095	Museo de La Plata
MLS	096	Museo de la Instituto de La Salle
MLU	097	Martin Luther Universitaet
MM	098	Universitaet Magdeburg
MMK	099	McGregor Museum
MMTT	100	Muze-ye Melli-ye Tarikh-e Tabii
MMUS	101	University of Sydney
MN	102	Universidade do Rio de Janeiro
MNCN	103	Museo Nacional de Ciencias Naturales, Madrid
MNCR	104	Museo Nacional, San Jose
MNH	105	Musei Nationalis Hungarici
MNHN	106	Museo Nacional de Historia Natural, Santiago
MNHNM	107	Museo Nacional de Historia Natural, Mexico City
MNHNSD	108	Museo Nacional de Historia Natural, Santo Domingo
MNHP	109	Museum National d'Histoire Naturelle, Paris
MPEG	110	Museu Paraenese "Emiliano Goeldi"
MPM	111	Milwaukee Public Museum
MRGS	112	Museu do Rio Grande do Sul
MRHN	113	Institut Royal des Sciences Naturelles de Belgique
MSB	114	Museum Sophia
MSNG	115	Museo Civico di Storia Naturale di Genova "Giacomo Doria"
MSNM	116	Museo Civico di Storia Naturale di Milano
MSNT	117	Museo Civico di Storia Naturale di Torino
MSP	118	Madras Snake Park
MSUM	119	Michigan State University
MSUMZ	120	Memphis State University
MTKD	032	Museum fuer Tierkunde, Dresden
MVZ	122	University of California at Berkeley
MZB	123	Museum Zoologicum Bogoriense
MZGZ	124	Museo di Zoologia del Giardino Zoologico
MZTG	125	Museo de Zoologia, Tuxtla Gutierrez
MZUF	126	Universita di Firenze
MZUS	127	Université de Strasbourg
MZUSP	128	Universidade do São Paulo
MZV	129	Zoological Museum, Varsovite
NHM	130	Naturhistorisches Museum, Bern
NHMB	131	Naturhistorisches Museum, Basel
NHMG	132	Naturhistoriska Museet, Göteborg
NHMW	133	Naturhistorisches Museum, Wien
NHRM	134	Naturhistoriske Riksmuseum, Stockholm
NMBO	135	National Museum, Bloemfontein
NMC	136	National Museums of Canada
NMK	137	National Museum, Nairobi
NMM	138	National Museum of Victoria
NMMH	139	North Manchurian Museum
NMP	140	Natal Museum
NMS	141	National Museum, Singapore
NMSU	142	New Mexico State University
NMWZ	276	National Museum of Wales
NMZ	144	National Museum of Zambia
NOAS	143	New Orleans Academy of Science
NTM	145	Northern Territory Museum

Acronym	Record #	Institution
NYSM	146	New York State Museum
OMNH	147	Osaka Museum of Natural History
OSM	148	Ohio State University
OSUC	150	Oregon State University
OSUS	149	Oklahoma State University
OUM	151	Oxford University
OUVC	152	Ohio University
OWU	153	Ohio Wesleyan University
PASSM	154	Peabody Academy of Science
PEM	155	Port Elizabeth Museum
PMAM	156	Peking Natural History Museum
PMV	158	Provincial Museum, Victoria
PU	159	Princeton University
PUC	157	Peking University
PUM	160	University di Pisa
QM	161	Queensland Museum
QVM	162	Queen Victoria Museum
QVMS	163	Queen Victoria Memorial Museum
RGMC	164	Musée Royal de l'Afrique Centrale
RM	165	Raffles Museum
RMB	166	National Museum, Bulawayo
RMNH	167	Rijksmuseum van Natuurlijke Historie
ROM	168	Royal Ontario Museum
RSM	169	Royal Scottish Museum
SAM	170	South African Museum
SAMA	171	South Australian Museum
SBMNH	276	Santa Barbara Museum of Natural History
SCN	172	Sociedad de Ciencias Naturales La Salle, Caracas
SDNHM	173	San Diego Natural History Museum
SIBAC	174	Southwest Institute of Biology, Chengtu
SIUC	179	Southern Illinois University
SM	175	Baylor University
SMF	176	Natur-Museum Senckenberg
SMG	177	State Museum, Tbilisi
SMK	178	Sarawak Museum
SMNH	180	Saskatchewan Museum of Natural History
SMNS	181	Staatliches Museum fuer Naturkunde, Stuttgart
SMP	184	Surinaams Museum
SMW	186	State Museum, Windhoek
SNCBSH	185	State of North Carolina Biological Station
SRI	187	Serengetti Research Institute
SRSU	188	Sul Ross State University
SSC	189	Sacramento State University
STUM	190	Santo Tomas University
SUB	191	Universitaet Bonn
SUM	192	Stellenbosch University
SWIBASC	193	Academia Sinica, Chengtu
TAIC	194	Texas A&I University
TAU	195	Tel Aviv University
TCWC	196	Texas A&M University
TIU	197	Tokyo Imperial University
TM	198	Transvaal Museum
TMS	199	Toledo Museum of Health and Natural History
TNHC	200	Texas Memorial Museum
TNHM	201	University of Texas at Austin
TSMHN	202	Teylers Strichtina Museum
TTU	203	Texas Tech University
TU	204	Tulane University
TZM	205	Tokyo Zoological Museum
UAB	207	Universidad de Los Andes, Bogota
UAIC	208	University of Abidjan
UAM	209	Universidad de Los Andes, Merida
UANL	210	Universidad Autonoma de Nuevo Leon
UAZ	206	University of Arizona
UBC	212	University of British Columbia
UBL	211	Université du Benin
UCC	213	University of Cincinnati
UCM	214	University of Colorado
UCP	215	Universidad Cauca
UCR	216	Universidad de Costa Rica
UCS	217	University of Connecticut
UDO	218	Universidad de Oriente
UDSM	219	University of Dar es Salaam
UG	220	University of Ghana
UI	221	University of Ibadan
UIM	222	University of Idaho
UIMNH	223	University of Illinois
UK	224	University of Kentucky
UKS	225	University of Khartoum
UL	226	University of Louisville
UM	227	Umtali Museum
UMF	228	University of Miami
UMKC	121	University of Missouri
UMKL	229	University of Malaysia
UMMZ	230	University of Michigan
UMP	231	University of Melbourne
UN	232	University of Nebraska
UNM	233	University of New Mexico
UO	234	University of Oklahoma
UOMNH	235	University of Oregon
UP	236	University of Papua and New Guinea
UPRM	237	University of Puerto Rico at Mayaguez
UPRP	238	University of Puerto at Rio Piedras
USA	239	University of South Alabama
USNM	240	National Museum of Natural History, Washington, D. C.
UTA	241	University of Texas at Arlington
UU	242	University of Utah
UV	243	Universidad del Valle, Cali
UVG	244	Universidad del Valle, Cuidad Guatemala
UZM	245	Universitetets Kφbenhaven
UZMO	246	Universitetets Oslo
WAM	247	Western Australian Museum
WCUUM	248	West China Union University
WSU	249	Washington State University
WUM	250	University of Witwatersrand
WVBS	251	West Virginia Biological Survey
YPM	252	Yale University
ZDEU	253	Ege Üniversitesi
ZDKU	254	Kharkov University
ZFMK	183	Zoologisches Forschungsinstitut und Museum Alexander Koenig
(ZFMK)	047	Universitaet Goettingen
ZIA	255	Armenian Academy of Sciences
ZIH	257	Universitaet Halle
ZIHU	258	Hiroshima University
ZIK	256	Ukrainian Academy of Sciences
ZIL	259	Academy of Sciences, Leningrad
ZIS	260	Universitaet Saarbrucken
ZIT	261	Grusinian Academy of Sciences
ZIUS	263	Universitetets Stockholm
ZIUU	264	Universitetets Uppsala
ZIUW	265	Universitaet Wien
ZIUZ	262	Zagreb University
ZMA	266	Universiteit van Amsterdam
ZMB	267	Universitaet Humboldt
ZMH	048	Zoologisches Museum fuer Hamburg
ZML	268	Leningrad State University
ZMLU	269	Universitetets Lund
ZMM	270	Moscow State University
ZMT	271	Georgian State Museum, Tbilisi
ZSI	272	Zoological Survey of India, Calcutta
ZSM	273	Zoologisches Sammlung des Bayerischen Staates
ZSP	274	Zoological Society of Philadelphia

SECTION II
CITIES INDEX FOR INSTITUTIONS

City	Acronym	Record #	Institution
Abidjan	UAIC	208	University of Abidjan
Accra	UG	220	University of Ghana
Adelaide	SAMA	171	South Australian Museum
Albany	NYSM	146	New York State Museum
Albuquerque	UNM	233	University of New Mexico
Alice Springs	CAM	043	Central Australian Museum
Alpine	SRSU	188	Sul Ross State University
Amsterdam	ZMA	266	Universiteit van Amsterdam
Ann Arbor	UMMZ	230	University of Michigan
Arlington	UTA	241	University of Texas at Arlington

City	Acronym	Record #	Institution
Athens	OUVC	152	Ohio University
Auburn	AUM	011	Auburn University
Austin	TNHM	201	University of Texas
"	TNHC	200	Texas Memorial Museum
Awash National Park	MA	075	Awash National Park
Bale	MHNB	087	Museum d'Histoire Naturelle
Bangalore	CCB	020	Central College
Bangkok	CUB	029	Chulalongkorn University
Basel	NHMB	131	Naturhistorisches Museum
Baton Rouge	LSUMZ	074	Louisiana State University
Belem	MPEG	110	Museu Paraenese "Emiliano Goeldi"
Bergen	BMBN	013	Bergen Museum
Berkeley	MVZ	122	University of California at Berkeley
Berlin	ZMB	267	Universitaet Humboldt
Bern	NHM	130	Naturhistorisches Museum
Bloemfontein	NMBO	135	National Museum
Bogor	MZB	123	Museum Zoologicum Bogoriense
Bogota	UAB	207	Universidad de Los Andes
"	MLS	096	Museo de la Instituto de La Salle
"	ICN	052	Universidad Nacional de Bogota
Bombay	BNHM	014	Bombay Natural History Museum
"	BNHS	015	Bombay Natural History Society
Bonn	SUB	191	Universitaet Bonn
"	ZFMK	183	Zoologisches Forschungsinstitut und Museum Alexander Koenig
Boulder	UCM	214	University of Colorado
Brisbane	QM	161	Queensland Museum
Brun	LMB	071	Landsmuseum Brun
Bruxelles	MRHN	113	Institut Royal des Sciences Naturelles de Belgique
Bucharest	MGAB	086	Museu "Gross Antipa"
Budapest	MNH	105	Musei Nationalis Hungarici
Buenos Aires	MACN	076	Museo Argentino de Ciencias Naturales
"	LIHUBA	070	Universidad de Buenos Aires
"	CHINM	021	Instituto Nacional de Microbiologia
Bulawayo	RMB	166	National Museum
Cagliari	IZUCS	062	Universita di Cagliari
Calcutta	ZSI	272	Zoological Survey of India
"	IM	054	Indian Museum
Cali	UV	243	Universidad del Valle
Cambridge	MCZ	082	Harvard University
Canberra	ANWC	042	Australian National Wildlife Collection
"	ANU	006	Australian National University
Cape Town	SUM	192	Stellenbosch University
"	SAM	170	South African Museum
Caracas	SCN	172	Sociedad de Ciencias Naturales La Salle
"	MHNLS	091	Museo de Historia Natural La Salle
"	MCNC	081	Museo de Ciencias Naturales
"	MBUCV	079	Universidad Central
Carbondale	SIUC	179	Southern Illinois University
Cardiff	NMWZ	276	National Museum of Wales
Charleston	CHM	022	Charleston Museum
Chengtu	SIBAC	174	Southwest Institute of Biology
"	SWIBASC	193	Academia Sinica
"	WCUUM	248	West China Union University
Chicago	CA	018	Chicago Academy of Sciences
"	FMNH	041	Field Museum of Natural History
Cincinnati	UCC	213	University of Cincinnati
Clarksville	APSU	007	Austin Peay State University
College Station	TCWC	196	Texas A&M University
Colombo	COM	024	Colombo Museum
Columbus	OSM	148	Ohio State University
Concepcion	IZUC	061	Universidad de Concepcion
Copenhagen	ZMUC	245	Universitetets Københaven
Coral Gables	UMF	228	University of Miami
Corvallis	OSUC	150	Oregon State University
Cumana	UDO	218	Universidad de Oriente
Dakar	IFAN	053	Instituto Fondamental d'Afrique Noire
Dallas	DMNH	034	Dallas Museum of Natural History
Dar es Salaam	UDSM	219	University of Dar es Salaam
Darwin	NTM	145	Northern Territory Museum
Delaware	OWU	153	Ohio Wesleyan University
Dresden	MTKD	032	Museum fuer Tierkunde
Dundo	MD	083	Museu do Dundo
Durban	DMD	033	Durban Museum
"	DSP	035	Fitzsimons' Snake Park
East Lansing	MSUM	119	Michigan State University
Edinburgh	RSM	169	Royal Scottish Museum
Ellensburg	CWS	031	Central Washington State College
Eugene	UOMNH	235	University of Oregon
Fayetteville	ARK	008	University of Arkansas
Firenze	MZUF	126	Universita di Firenze
Fort Worth	FWM	045	Fort Worth Museum of Science and History
Frankfurt-am-Main	SMF	176	Natur-Museum Senckenberg
Gainesville	FSM	044	University of Florida
Geneve	MHNG	088	Museum d'Histoire Naturelle
Genova	MSNG	115	Museo Civico di Storia Naturale di Genova
Goettingen	ZFMK	047	Universitaet Goettingen
Göteborg	NHMG	132	Naturhistoriska Museet
Grahamstown	AMG	003	Albany Museum
Greeley	CSTC	027	Colorado State Teachers College
Guanajuato	MDUG	084	Universidad Guanajuato
Guatemala	UVG	244	Universidad del Valle
Haarlem	TSMHN	202	Teylers Strichtina Museum
Halle	ZIH	257	Universitaet Halle
Halle-Wittenberg	MLU	097	Martin Luther Universitaet
Hamburg	ZMH	048	Zoologisches Museum fuer Hamburg
Harbin	NMMH	139	North Manchurian Museum
Havana	IZAC	059	Academia de Ciencias
"	MBZH	080	Museo y Biblioteca de la Zoologia
"	MFP	085	Museo Felipe Poey
Highlands	SNCBSH	185	State of North Carolina Biological Station
Hiroshima	ZIHU	258	Hiroshima University
Honolulu	BPBM	016	Bernice P. Bishop Museum
Huntington	WVBS	251	West Virginia Biological Survey
Ibadan	UI	221	University of Ibadan
Ithaca	CU	028	Cornell University
Izmir	ZDEU	253	Ege Üniversitesi
Jerevan	ZIA	255	Academy of Sciences
Jerusalem	HUJ	049	Hebrew University
Johannesburg	WUM	250	University of Witwatersrand
Kansas City	UMKC	121	University of Missouri
Karlsruhe	LNK	278	Landessammlungen fuer Naturkunde
Kharkov	ZDKU	254	Kharkov University
Khartoum	UKS	225	University of Khartoum
Kiev	ZIK	256	Academy of Sciences
Kimberley	MMK	099	McGregor Museum
Kingsville	TAIC	194	Texas A&I University
King Williams' Town	KMK	065	Kaffarian Museum
Krakow	KM	064	Krakow Museum
Kuala Lumpur	UMKL	229	University of Malaysia
Kuching	SMK	178	Sarawak Museum
La Plata	MLP	095	Museo de La Plata
La-Chaux-de-Fond	LCFM	069	Musée La-Chaux-de-Fond
Launceston	QVM	162	Queen Victoria Museum
Lawrence	KU	067	University of Kansas
Leiden	RMNH	167	Rijksmuseum van Natuurlijke Historie
Leningrad	ZIL	259	Academy of Sciences
"	ZML	268	Leningrad State University
Lexington	UK	224	University of Kentucky
Lima	MHNJP	089	Universidad Nacional Mayor de San Marcos
Lincoln	UN	232	University of Nebraska
Lisbon	CZL	030	Centro de Zoologia
"	MBL	078	Universidade Lisboa
"	MHNL	090	Museu do Historia Naturale
Liverpool	LIVCM	277	Merseyside County Museums
Livingstone	NMZ	144	National Museum of Zambia
Ljubljana	ML	094	Prirodosloveni Muzej Slovenije
Lome	UBL	211	Université du Benin

City	Acronym	Record #	Institution
London	BM	012	British Museum (Natural History)
Los Angeles	CRE	026	University of Southern California
"	LACM	068	Los Angeles County Museum of Natural History
Louisville	UL	226	University of Louisville
Lourencos Marques	LMM	072	Alvaro de Castro
Lubbock	TTU	203	Texas Tech University
Lund	ZMLU	269	Universitetets Lund
Madras	MAD	077	Madras Museum
"	MSP	118	Madras Snake Park
Madrid	MNCN	103	Museo Nacional de Ciencias Naturales
Magdeburg	MM	098	Universitaet Magdeburg
Manila	STUM	190	Santo Tomas University
Maracay	EBRG	037	Estacion Biologia de Rancho Grande
Mayaguez	UPRM	237	University of Puerto Rico at Mayaguez
Melbourne	NMM	138	National Museum of Victoria
Memphis	MSUMZ	120	Memphis State University
Mendoza	IBMUNC	051	Universidad Nacional de Cuyo
Merida	UAM	209	Universidad de Los Andes
Mexico City	ECNB	038	Escuela Nacional Ciencias
"	IPN	058	Instituto Politécnico Nacional
"	MNHNM	107	Museo Nacional de Historia Natural
Milano	MSNM	116	Museo Civico di Storia Naturale di Milano
Milwaukee	MPM	111	Milwaukee Public Museum
Minneapolis	JFBM	063	James Ford Bell Museum of Natural History
Mobile	USA	239	University of South Alabama
Monterrey	UANL	210	Universidad Autonoma de Nuevo Leon
Montevideo	DZVU	036	Universidad de Uruguay
"	MHNM	092	Museo de Historia Natural de Montevideo
Moscow (Idaho)	UIM	222	University of Idaho
Moscow (USSR)	ZMM	270	Moscow State University
Munich	ZSM	273	Zoologisches Sammlung des Bayerischen Staates
Nairobi	NMK	137	National Museum
New Haven	YPM	252	Yale University
New Orleans	NOAS	143	New Orleans Academy of Science
"	TU	204	Tulane University
New York	AMNH	004	American Museum of Natural History
Norman	UO	234	University of Oklahoma
Osaka (y Shibota)	OMNH	147	Osaka Museum of Natural History
Oslo	UZMO	246	Universitetets Oslo
Ottawa	NMC	136	National Museums of Canada
Oxford	OUM	151	Oxford University
Panama City	GML	046	Gorgas Memorial Laboratory
Paramaribo	SMP	184	Surinaams Museum
Paris	MNHNP	109	Museum National d'Histoire Naturelle
Parkville	UMP	231	University of Melbourne
Peking	PMAM	156	Peking Natural History Museum
"	PUC	157	Peking University
Perth	WAM	247	Western Australian Museum
Philadelphia	ANSP	005	Academy of Natural Sciences
"	ZSP	274	Zoological Society of Philadelphia
Pietermaritzburg	NMP	140	Natal Museum
Pisa	PUM	160	Universita di Pisa
Pittsburgh	CM	023	Carnegie Museum
Popayan	UCP	215	Universidad Cauca
Port Elizabeth	PEM	155	Port Elizabeth Museum
Port Moresby	UP	236	University of Papua and New Guinea
Porto Alegre	MRGS	112	Museu do Rio Grande do Sul
Pretoria	TM	198	Transvaal Museum
Princeton	PU	159	Princeton University
Provo	BYU	017	Brigham Young University
Pullman	WSU	249	Washington State University
Quito	EPN	040	Escuela Politécnica Nacional
Rio de Janeiro	EI	039	Universidade Federal Rural
"	IOC	057	Instituto Oswaldo Cruz
"	MN	102	Universidade do Rio de Janeiro
Rio Piedras	UPRP	238	University of Puerto Rico at Rio Piedras
Rome	MZGZ	124	Museo di Zoologia del Giardino Zoologico
Saarbrucken	ZIS	260	Universitaet Saarbrucken
Sacramento	SSC	189	Sacramento State University
Salem	PASSM	154	Peabody Academy of Science
Salisbury	QVMS	163	Queen Victoria Memorial Museum
Salt Lake City	UU	242	University of Utah
San Diego	SDNHM	173	San Diego Natural History Museum
San Francisco	CAS	019	California Academy of Sciences
San Jose	MNCR	104	Museo Nacional
"	UCR	216	Universidad de Costa Rica
Santa Barbara	SBMNH	275	Santa Barbara Museum of Natural History
Santiago	MNHNS	106	Museo Nacional de Historia Natural
Santo Domingo	MNHNSD	108	Museo Nacional de Historia Natural
São Paulo	IB	050	Instituto Butantan
"	MZUSP	128	Universidade do São Paulo
Saskatoon	SMNH	180	Saskatchewan Museum of Natural History
Seronera	SRI	187	Serengetti Research Institute
Shreveport	LSUS	073	Louisiana State University
Singapore	NMS	141	National Museum
"	RM	165	Raffles Museum
Skukuza	KNP	066	Kruger National Park
Sophia	MSB	114	Museum Sophia
St. Louis	ASSL	009	Academy of Science of St. Louis
Stillwater	OSUS	149	Oklahoma State University
Stockholm	NHRM	134	Naturhistoriske Riksmuseum
"	ZIUS	263	Universitetets Stockholm
Storrs	UCS	217	University of Connecticut
Strasbourg	MZUS	127	Université de Strasbourg
Stuttgart	SMNS	181	Staatliches Museum fuer Naturkunde
Sydney	AM	002	Australian Museum
"	MMUS	101	University of Sydney
Tacoma	CPS	025	University of Puget Sound
Tbilisi	ZIT	261	Grusinian Academy of Sciences
"	ZMT	271	Georgian State Museum
Tehran	MMTT	100	Muze-ye Melli-ye Tarikh-e Tabii
Tel Aviv	TAU	195	Tel Aviv University
Tempe	ASU	010	Arizona State University
Tervuren	RGMC	164	Musée Royal de l'Afrique Centrale
Tokyo	TIU	197	Tokyo Imperial University
"	TZM	205	Tokyo Zoological Museum
Toledo	TMS	199	Toledo Museum of Health and Natural History
Torino	MSNT	117	Museo Civico di Storia Naturale di Torino
Toronto	ROM	168	Royal Ontario Museum
Tucson	UAZ	206	University of Arizona
Tucuman	FML	055	Instituto Fundacion Miguel Lillo
Tuxtla Gutierrez	MZTG	125	Museo de Zoologia
Ulan-Bator	BIUB	182	Mongolian Academy of Sciences
Umtali	UM	227	Umtali Museum
University	ALA	001	University of Alabama
University Park	NMSU	142	New Mexico State University
Uppsala	ZIUU	264	Universitetets Uppsala
Urbana	INHS	056	Illinois Natural History Survey
"	UIMNH	223	University of Illinois
Valdivia	IZUA	060	Universidad Austral
Valpariso	MHNV	093	Museo de Historia Natural de Valpariso
Vancouver	UBC	212	University of British Columbia
Varsovite	MZV	129	Zoological Museum
Victoria	PMV	158	Provincial Museum
Vienna	NHMW	133	Naturhistorisches Museum
"	ZIUW	265	Universitaet Wien
Waco	SM	175	Baylor University
Washington, D.C.	USNM	240	National Museum of Natural History
Windhoek	SMW	186	State Museum
Zagreb	ZIUB	262	Zagreb University

SECTION III
INSTITUTIONAL LIST

(001) University of Alabama, Museum of Natural History [ALA]
University, Alabama, United States 35486

(002) Australian Museum, Department of Herpetology [AM]
6-8 College Street, Sydney, NSW, Australia

(003) Albany Museum [AMG]
Grahamstown, Cape Province, South Africa

(004) American Museum of Natural History, Department of Herpetology [AMNH]
79th Street and Central Park West, New York, New York, United States 10024

(005) Academy of Natural Sciences, Department of Herpetology [ANSP]
19th and Benjamin Franklin Parkway, Philadelphia, Pennsylvania, United States 19103

(006) Australian National University, Department of Zoology [ANU]
Canberra, ACT, Australia

(007) Austin Peay State University, Museum [APSU]
College Street, Clarksville, Tennessee, United States 37040

(008) University of Arkansas, Museum [ARK]
Fayetteville, Arkansas, United States 72701

(009) Academy of Science of St. Louis [ASSL]
St. Louis, Missouri, United States 63100

(010) Arizona State University [ASU]
Tempe, Arizona, United States 85281

(011) Auburn University, Museum [AUM]
Auburn, Alabama, United States 36830

(012) British Museum (Natural History), Department of Zoology [BM]
Cromwell Road, London SW7 5BD, England

(013) Bergen Museum [BMBN]
Bergen, Norway

(014) Bombay Natural History Museum [BNHM]
Bombay, India

(015) Bombay Natural History Society [BNHS]
Bombay, India

(016) Bernice P. Bishop Museum, Department of Zoology [BPBM]
1355 Kalihi Street, Honolulu, Hawaii, United States 96818

(017) Brigham Young University, Monte L. Bean Life Science Museum [BYU]
Provo, Utah, United States 84601

(018) Chicago Academy of Sciences [CA]
2001 N. Clark Street, Chicago, Illinois, United States 60614

(019) California Academy of Sciences, Department of Herpetology [CAS, CAS-SU]
Golden Gate Park, San Francisco, California, United States 94118
Remarks: Includes Stanford University collections separately catalogued (CAS-SU)

(020) Central College [CCB]
Bangalore, India

(021) Instituto Nacional de Microbiologia [CHINM]
Buenos Aires, Argentina

(022) Charleston Museum [CHM]
121 Rutledge Avenue, Charleston, South Carolina, United States 29401

(023) Carnegie Museum, Department of Herpetology [CM]
4400 Forbes Avenue, Pittsburgh, Pennsylvania, United States 15213

(024) Colombo Museum [COM]
Colombo, Sri Lanka

(025) University of Puget Sound [CPS]
1500 N. Warner Street, Tacoma, Washington, United States 98416

(026) University of Southern California, Allan Hancock Foundation [CRE]
Los Angeles, California, United States 90007

(027) Colorado State Teachers College [CSTC]
Greeley, Colorado, United States 80631

(028) Cornell University [CU]
Ithaca, New York, United States 14853

(029) Chulalongkorn University [CUB]
Bangkok, Thailand

(030) Centro de Zoologia [CZL]
Lisbon, Portugal

(031) Central Washington State College, Department of Biology [CWS]
Ellensburg, Washington, United States 98926

(032) Museum fuer Tierkunde [MTKD]
Dresden, Germany (DDR)

(033) Durban Museum [DMD]
Durban, Natal, South Africa

(034) Dallas Museum of Natural History [DMNH]
P.O. Box 26193, Fair Park Station, Dallas, Texas, United States 75226

(035) Fitzsimons' Snake Park [DSP]
Durban, Natal, South Africa

(036) Universidad de Uruguay, Departmento de Zoologia Vertebrados [DZVU]
Montevideo, Uruguay

(037) Estacion Biologia de Rancho Grande, Museo [EBRG]
Maracay, Venezuela

(038) Escuela Nacional Ciencias, Coleccion Herpetozoarios [ECNB]
Mexico City, DF, Mexico

(039) Universidade Federal Rural, Eugenio Izecksohn [EI]
Rio de Janeiro, Brasil

(040) Escuela Politécnica Nacional [EPN]
Quito, Ecuador

(041) Field Museum of Natural History, Division of Amphibians and Reptiles [FMNH]
Roosevelt Road and Lake Shore Drive, Chicago, Illinois, United States 60605

(042) Australian National Wildlife Collection [ANWC]
Canberra, ACT, Australia

(043) Central Australian Museum [CAM]
Alice Springs, NT, Australia

(044) University of Florida, Florida State Museum [FSM]
Museum Road, Gainesville, Florida, United States 32611

(045) Fort Worth Museum of Science and History [FWM]
1501 Montgomery Street, Fort Worth, Texas, United States 76107

(046) Gorgas Memorial Laboratory [GML]
Panama City, Panama

(047) Universitaet Goettingen, Zoologisches Museum [ZFMK]
Goettingen, Germany
Remarks: Merged with Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn (see Record # 183)

(048) Zoologisches Museum fuer Hamburg [ZMH]
Hamburg, Germany

(049) Hebrew University, Department of Zoology [HUJ]
Jerusalem, Israel

(050) Instituto Butantan [IB]
São Paulo, São Paulo, Brasil

(051) Universidad Nacional de Cuyo, Instituto de Biologia Animal [IBMUNC]
Mendoza, Argentina

(052) Universidad Nacional de Bogota, Instituto de Ciencias Naturales [ICNB]
Bogota, Columbia

(053) Instituto Fondamental d'Afrique Noire [IFAN]
Dakar, Senegal

(054) Indian Museum [IM]
Calcutta, India

(055) Instituto Fundacion Miguel Lillo [FML]
Miguel Lillo 205, Tucuman 4000, Argentina

(056) Illinois Natural History Survey [INHS]
Urbana, Illinois, United States 61801

(057) Instituto Oswaldo Cruz [IOC]
Rio de Janeiro, Brasil

(058) Instituto Politécnico Nacional [IPN]
Mexico City, DF, Mexico

(059) Academia de Ciencias, Instituto de Zoologia [IZAC]
Havana, Cuba

(060) Universidad Austral, Instituto de Zoologia [IZUA]
Valvidia, Chile

(061) Universidad de Concepcion, Instituto de Zoologia [IZUC]
Concepcion, Chile

(062) Universita di Cagliari, Instituto de Zoologia [IZUCS]
Cagliari, Sardinia, Italy

(063) James Ford Bell Museum of Natural History [JFBM]
Minneapolis, Minnesota, United States 55400

(064) Krakow Museum [KM]
Krakow, Poland

(065) Kaffarian Museum [KMK]
King William's Town, Cape Province, South Africa

(066) Kruger National Park [KNP]
Skukuza, Transvaal, South Africa

(067) University of Kansas, Museum of Natural History [KU]
Lawrence, Kansas, United States 66045

(068) Los Angeles County Museum of Natural History, Section of Herpetology [LACM]
900 Exposition Boulevard, Los Angeles, California, United States 90007

(069) Musée La-Chaux-de-Fond [LCFM]
La-Chaux-de-Fond, Switzerland

(070) Universidad de Buenos Aires [LIHUBA]
Buenos Aires, Argentina

(071) Landsmuseum Brun [LMB]
Brun, Czechoslovakia

(072) Alvaro de Castro [LMM]
Lourencos Marques, Mozambique

(073) Louisiana State University, Museum of Life Science [LSUS]
8515 Youree Drive, Shreveport, Louisiana, United States 71115

(074) Louisiana State University, Museum of Zoology [LSUMZ]
University Station, Baton Rouge, Louisiana, United States 70803

(075) Awash National Park, Museum [MA]
Awash National Park, Ethiopia

(076) Museo Argentino de Ciencias Naturales, Seccion Herpetologia [MACN]
Avenida Angel Gallardo 470, Buenos Aires, Argentina

(077) Madras Museum [MAD]
Madras, India

(078) Universidade Lisboa, Museu Bocage [MBL]
Faculdade de Ciencias, Lisbon, Portugal

(079) Universidad Central, Museo de Biologia [MBUCV]
Caracas, Venezuela

(080) Museo y Biblioteca de la Zoologia [MBZH]
Havana, Cuba

(081) Museo de Ciencias Naturales [MCNC]
Caracas, Venezuela

(082) Harvard University, Museum of Comparative Zoology [MCZ]
Cambridge, Massachusetts, United States 02138

(083) Museu do Dundo [MD]
Dundo, Angola

(084) Universidad Guanajuato, Museo Alfredo Duges [MDUG]
Guanajuanto, Mexico

(085) Museo Felipe Poey [MFP]
Havana, Cuba

(086) Museu "Gross Antipa" [MGAB]
Bucharest, Romania

(087) Museum d'Histoire Naturelle [MHNB]
Bale, Switzerland

(088) Museum d'Histoire Naturelle [MHNG]
Route de Malagnou, Case Postale 284, Geneve (6), CH-1211, Switzerland

(089) Universidad Nacional Mayor de San Marcos, Museo Historia Natural "Javier Prado" [MHNJP]
Avenida Arenales 1256, Lima, Peru

(090) Museu do Historia Naturale [MHNL]
Lisbon, Portugal

(091) Museo de Historia Natural La Salle [MHNLS]
Caracas, Venezuela

(092) Museo de Historia Natural de Montevideo, Enc. Herpetologia [MHNM]
Montevideo, Uruguay

(093) Museo de Historia Natural de Valpariso [MHNV]
Valpariso, Chile

(094) Prirodosloveni Muzej Slovenije [ML]
Presernova 20, Ljubljana, Yugoslavia

(095) Museo de La Plata [MLP]
Paseo del Bosque, La Plata, Argentina

(096) Museo del Instituto de La Salle [MLS]
Bogota, Colombia

(097) Martin Luther Universitaet [MLU]
Halle-Wittenberg, Germany

(098) Universitaet Magdeburg [MM]
Magdeburg, Germany (DDR)

(099) McGregor Museum [MMK]
Kimberley, Cape Province, South Africa

(100) Muze-ye Melli-ye Tarikh-e Tabii [MMTT]
Tehran, Iran

(101) University of Sydney, Macleay Museum [MMUS]
Sydney, NSW, Australia

(102) Universidade do Rio de Janeiro, Museu Nacional [MN]
Quinta da Boa Vista, Rio de Janeiro, Brasil

(103) Museo Nacional de Ciencias Naturales [MNCN]
Madrid, Spain

(104) Museo Nacional [MNCR]
San Jose, Costa Rica

(105) Musei Nationalis Hungarici [MNH]
Budapest, Hungary

(106) Museo Nacional de Historia Natural, Seccion Herpetologia [MNHNS]
Santiago, Chile

(107) Museo Nacional de Historia Natural [MNHNM]
Mexico City, DF, Mexico

(108) Museo Nacional de Historia Natural [MNHNSD]
Santo Domingo, Republica Dominicana

(109) Museum National d'Histoire Naturelle, Laboratoire des Amphibiens et Reptiles [MNHNP]
8, Rue de Buffon, Paris 75005, France

(110) Museu Paraenese "Emiliano Goeldi" [MPEG]
Belem, Para, Brasil

(111) Milwaukee Public Museum, Vertebrate Zoology [MPM]
800 W. Wells Street, Milwaukee, Wisconsin, United States 53233

(112) Museu do Rio Grande do Sul [MRGS]
Porte Alegre, Rio Grande do Sul, Brasil

(113) Institut Royal des Sciences Naturelles de Belgique [MRHN]
Bruxelles (B-1040), Belgium

(114) Museum Sophia [MSB]
Sophia, Bulgaria

(115) Museo Civico di Storia Naturale di Genova "Giacomo Doria" [MSNG]
Genova, Italy

(116) Museo Civico di Storia Naturale di Milano [MSNM]
Milano, Italy

(117) Museo Civico di Storia Naturale di Torino [MSNT]
Torino, Italy

(118) Madras Snake Park [MSP]
Madras, India

(119) Michigan State University, University Museum [MSUM]
West Circle Drive, East Lansing, Michigan, United States 48824

(120) Memphis State University, Museum of Zoology [MSUMZ]
Memphis, Tennessee, United States 38152

(121) University of Missouri [UMKC]
5100 Rockhill Road, Kansas City, Missouri, United States 64110

(122) University of California at Berkeley, Museum of Vertebrate Zoology [MVZ]
Berkeley, California, United States 94720

(123) Museum Zoologicum Bogoriense [MZB]
Kebun Raya Bogor, Bogor, Java, Indonesia

(124) Museo di Zoologia del Giardino Zoologico [MZGZ]
Rome, Italy

(125) Museo de Zoologia [MZTG]
Tuxtla Gutierrez, Chiapas, Mexico

(126) Universita di Firenze, Museo Zoologico [MZUF]
Via Romana 17, Firenze 50125, Italy

(127) Université de Strasbourg, Musée de Zoologie [MZUS]
Strasbourg, France

(128) Universidade do São Paulo, Museu Paulista [MZUSP]
Avenida Nazareth 481, C. P. 7172, São Paulo, São Paulo, Brasil

(129) Zoological Museum [MZV]
Varsovite, USSR

(130) Naturhistorisches Museum [NHM]
Bern, Switzerland

(131) Naturhistorisches Museum [NHMB]
Basel, Switzerland

(132) Naturhistoriska Museet [NHMG]
Göteborg, Sweden

(133) Naturhistorisches Museum [NHMW]
Ringstrasse, Vienna, Austria

(134) Naturhistoriske Riksmuseum [NHRM]
S-104 05 Stockholm, Sweden

(135) National Museum [NMBO]
P.O. Box 266, Bloemfontein, Orange Free State, South Africa

(136) National Museums of Canada [NMC]
Ottawa, Ontario, Canada

(137) National Museum [NMK]
Nairobi, Kenya

(138) National Museum of Victoria [NMM]
285-321 Russell Street, Melbourne, Victoria 3000, Australia

(139) North Manchurian Museum [NMMH]
Harbin, Manchuria, China

(140) Natal Museum [NMP]
Pietermaritzburg, Natal, South Africa

(141) National Museum [NMS]
Singapore, Singapore

(142) New Mexico State University [NMSU]
University Park, New Mexico, United States 88003

(143) New Orleans Academy of Science [NOAS]
New Orleans, Louisiana, United States 70100

(144) National Museum of Zambia [NMZ]
Livingstone, Zambia

(145) Northern Territory Museum [NTM]
Darwin, NT, Australia

(146) New York State Museum [NYSM]
Cultural Education Center, Empire State Plaza, Albany, New York, United States 12224

(147) Osaka Museum of Natural History [OMNH]
Osaka (y Shibota), Japan

(148) Ohio State University, Museum [OSM]
1659 N. High Street, Columbus, Ohio, United States 43210

(149) Oklahoma State University, Museum of Natural and Cultural History [OSUS]
Stillwater, Oklahoma, United States 74074

(150) Oregon State University, Museum of Natural History [OSUC]
Corvallis, Oregon, United States 97331

(151) Oxford University, Museum [OUM]
Oxford, England

(152) Ohio University, Vertebrate Collection [OUVC]
Athens, Ohio, United States 45701

(153) Ohio Wesleyan University [OWU]
Delaware, Ohio, United States 43015

(154) Peabody Academy of Science [PASSM]
Salem, Massachusetts, United States 01970

(155) Port Elizabeth Museum, Herpetology [PEM]
P.O. Box 13147, Humewood 6013, Port Elizabeth, South Africa

(156) Peking Natural History Museum [PMAM]
Peking, China

(157) Peking University [PUC]
Peking, China

(158) Provincial Museum [PMV]
Victoria, British Columbia V8V 1X4, Canada

(159) Princeton University [PU]
Princeton, New Jersey, United States 08540

(160) Universita di Pisa [PUM]
Pisa, Italy

(161) Queensland Museum [QM]
Gregory Terrace, Brisbane, Queensland, Australia

(162) Queen Victoria Museum [QVM]
Launceston, Tasmania, Australia

(163) Queen Victoria Memorial Museum [QVMS]
Salisbury, Zimbabwe

(164) Musée Royal de l'Afrique Centrale [RGMC]
Tervuren B-1980, Belgium

(165) Raffles Museum [RM]
Singapore, Singapore

(166) National Museum [RMB]
Bulawayo, Zimbabwe

(167) Rijksmuseum van Natuurlijke Historie [RMNH]
Leiden, Holland

(168) Royal Ontario Museum, Ichthyology and Herpetology [ROM]
100 Queen's Park, Toronto, Ontario, Canada

(169) Royal Scottish Museum [RSM]
Chambers Street, Edinburgh, Scotland

(170) South African Museum [SAM]
P.O. Box 61, Cape Town, Cape Province, South Africa

(171) South Australian Museum [SAMA]
North Terrace, Adelaide, South Australia, Australia

(172) Sociedad de Ciencias Naturales La Salle [SCN]
Caracas, Venezuela

(173) San Diego Natural History Museum, Department of Herpetology [SDNHM]
Balboa Park, San Diego, California, United States 92112

(174) Southwest Institute of Biology [SIBAC]
Chengtu, Szechwan, China

(175) Baylor University, Strecker Museum [SM]
Waco, Texas, United States 76703

(176) Natur-Museum Senckenberg [SMF]
Senckenberg Anlage 25, Frankfurt-am-Main, Germany

(177) State Museum [SMG]
Tbilisi, GSSR, USSR

(178) Sarawak Museum [SMK]
Kuching, Sarawak, Malaysia

(179) Southern Illinois University, University Museum [SIUC]
Carbondale, Illinois, United States 62901

(180) Saskatchewan Museum of Natural History [SMNH]
Saskatoon, Saskatchewan, Canada

(181) Staatliches Museum fuer Naturkunde [SMNS]
Arsenalplatz 3, Stuttgart, Germany

(182) Mongolian Academy of Sciences, Biological Institute [BIUB]
Ulan-Bator, Mongolia

(183) Zoologisches Forschunginstitut und Museum Alexander Koenig, Herpetologische Abteilung [ZFMK]
Adenaurallee 150-164, Bonn-1 5300, Germany
Remarks: See remarks under Universitaet Goettingen (Record # 047)

(184) Surinaams Museum [SMP]
Paramaribo, Surinam

(185) State of North Carolina Biological Station [SNCBSH]
Highlands, North Carolina, United States 28741

(186) State Museum [SMW]
Windhoek, Southwest Africa, South Africa

(187) Serengetti Research Institute [SRI]
Seronera, Tanzania

(188) Sul Ross State University [SRSU]
Alpine, Texas, United States 79830

(189) Sacramento State University, Museum of Natural History [SSC]
6000 J Street, Sacramaneto, California, United States 95819

(190) Santo Tomas University, Museum [STUM]
Manila, Luzon, Philippines

(191) Universitaet Bonn, Sammlung der Universitaet [SUB]
Bonn, Germany

(192) Stellenbosch University, J. R. Ellerman Zoological Museum [SUM]
Cape Town, Cape Province, South Africa

(193) Academia Sinica, Southwest Institute of Biology [SWIBASC]
Chengtu, Szechwan, China

(194) Texas A&I University, John E. Conner Museum [TAIC]
Kingsville, Texas, United States 78363

(195) Tel Aviv University [TAU]
Tel Aviv, Israel

(196) Texas A&M University, Texas Cooperative Wildlife Collection [TCWC]
College Station, Texas, United States 77843

(197) Tokyo Imperial University, Science College Museum [TIU]
Tokyo, Japan

(198) Transvaal Museum [TM]
P.O. Box 413, Pretoria, Transvaal, South Africa

(199) Toledo Museum of Health and Natural History [TMS]
Toledo, Ohio, United States 43609

(200) Texas Memorial Museum, Texas Natural History Collection [TNHC]
24th and Trinity, Austin, Texas, United States 78705

(201) University of Texas, Natural History Museum [TNHM]
Austin, Texas, United States 78712

(202) Teylers Strichtina Museum [TSMHN]
Haarlem, Holland

(203) Texas Tech University, Museum [TTU]
P.O. Box 4499, Lubbock, Texas, United States 79409

(204) Tulane University [TU]
6823 St. Charles Avenue, New Orleans, Louisiana, United States 70118

(205) Tokyo Zoological Museum [TZM]
Tokyo, Japan

(206) University of Arizona, Department of Ecology and Evolutionary Biology [UAZ]
Tucson, Arizona, United States 85721

(207) Universidad de Los Andes [UAB]
Bogota, Colombia

(208) Université de Abidjan [UAIC]
Abidjan, Cote d'Ivorie

(209) Universidad de Los Andes [UAM]
Merida, Venezuela

(210) Universidad Autonoma de Nuevo Leon [UANL]
Monterrey, Nuevo Leon, Mexico

(211) Université du Benin [UBL]
Lome, Togo

(212) University of British Columbia, Cowan Vertebrate Museum [UBC]
2075 Westbrook Place, Vancouver, British Columbia, Canada

(213) University of Cincinnati [UCC]
2624 Clifton Avenue, Cincinnati, Ohio, United States 45221

(214) University of Colorado, Museum of Natural History [UCM]
Broadway between 15th and 16th Streets, Boulder, Colorado, United States 80309

(215) Universidad Cauca, Museo de Historia Natural [UCP]
Popayan, Colombia

(216) Universidad de Costa Rica [UCR]
San Jose, Costa Rica

(217) University of Connecticut [UCS]
Storrs, Connecticut, United States 06268

(218) Universidad de Oriente [UDO]
Cumana, Venezuela

(219) University of Dar es Salaam [UDSM]
P.O. Box 35064, Dar es Salaam, Tanzania

(220) University of Ghana [UG]
Accra, Legon, Ghana

(221) University of Ibadan [UI]
Ibadan, Nigeria

(222) University of Idaho, Museum of Natural History [UIM]
Moscow, Idaho, United States 83843

(223) University of Illinois, Museum of Natural History [UIMNH]
Urbana, Illinois, United States 61801

(224) University of Kentucky [UK]
Lexington, Kentucky, United States 40506

(225) University of Khartoum [UKS]
Khartoum, Sudan

(226) University of Louisville [UL]
2301 S 3rd Street, Louisville, Kentucky, United States 40208

(227) Umtali Museum [UM]
Umtali, Zimbabwe

(228) University of Miami [UMF]
University Station, Coral Gables, Florida, United States 33124

(229) University of Malaysia [UMKL]
Kuala Lumpur, Malaysia

(230) University of Michigan, Museum of Zoology [UMMZ]
Ann Arbor, Michigan, United States 48104

(231) University of Melbourne [UMZ]
Parkville, Victoria, Australia

(232) University of Nebraska, Nebraska State Museum [UN]
Lincoln, Nebraska, United States 68588

(233) University of New Mexico, Museum of Southwest Biology [UNM]
Albuquerque, New Mexico, United States 87131

(234) University of Oklahoma, Stovall Museum [UO]
660 Parrington Oval, Norman, Oklahoma, United States 73069

(235) University of Oregon, Museum of Natural History [UOMNH]
Eugene, Oregon, United States 97403

(236) University of Papua and New Guinea [UP]
Port Moresby, Papua, Papua

(237) University of Puerto Rico at Mayaguez [UPRM]
Mayaguez, Puerto Rico, United States 00708

(238) University of Puerto Rico at Rio Piedras [UPRP]
Rio Piedras, Puerto Rico, United States 00931

(239) University of South Alabama [USA]
Mobile, Alabama, United States 36688

(240) National Museum of Natural History, Division of Reptiles and Amphibians [USNM]
The Mall, Washington, D. C., United States 20560

(241) University of Texas at Arlington [UTA]
Arlington, Texas, United States 76019

(242) University of Utah [UU]
1400 E. 2nd South Street, Salt Lake City, Utah, United States 84112

(243) Universidad del Valle [UV]
Apartado Aereo 2188, Cali, Colombia

(244) Universidad del Valle [UVG]
Cuidad Guatemala, Guatemala

(245) Universitets Kφbenhaven, Zoologisk Museum [ZMUC]
Universitetsparken 15, Kφbenhaven DK-2100, Denmark

(246) Universitets Oslo, Zoologisk Museum [UZMO]
Oslo, Norway

(247) Western Australian Museum [WAM]
Perth, Western Australia, Australia

(248) West China Union University, Museum [WCUUM]
Chengtu, Szechwan, China

(249) Washington State University, C. R. Conner Museum [WSU]
Pullman, Washington, United States 99163

(250) University of Witwatersrand [WUM]
Johannesburg, Cape Province, South Africa

(251) West Virginia Biological Survey [WVBS]
Huntington, West Virginia, United States 25700

(252) Yale University, Peabody Museum [YPM]
170 Whitney Avenue, New Haven, Connecticut, United States 06520

(253) Ege Üniversitesi, Fen Fakültesi, Sistematik Zooloji Kürsüsü [ZDEU]
Bornova, Izmir, Turkey

(254) Kharkov University [ZDKU]
Kharkov, USSR, USSR

(255) Armenian Academy of Sciences, Zoological Institute [ZIA]
Jerevan, ASSR, USSR

(256) Ukrainian Academay of Sciences, Zoological Institute [ZIK]
Kiev-30 252150, USSR, USSR

(257) Universitaet Halle, Zoologisches Institut [ZIH]
Halle, Germany (DDR)

(258) Hiroshima University, Zoological Institute [ZIHU]
Hiroshima, Japan

(259) Academy of Sciences, Zoological Institute [ZIL]
Leningrad Center, Leningrad V-164, USSR

(260) Universitaet Saarbrucken [ZIS]
Saarbrucken, Germany

(261) Grusinian Academy of Sciences, Zoological Institute [ZIT]
Tbilisi, GSSR, USSR

(262) Zagreb University, Zoological Institute [ZIUZ]
Zagreb, Yugoslavia

(263) Universitetets Stockholm, Zoologisk Institut [ZIUS]
Stockholm, Sweden

(264) Universitetets Uppsala, Zoologisk Institut [ZIUU]
Uppsala, Sweden

(265) Universitaet Wien, Zoologisches Institut [ZIUW]
Vienna, Austria

(266) Universiteit van Amsterdam, Zoologisch Museum [ZMA]
Amsterdam-C, Holland

(267) Universitaet Humboldt, Zoologisches Museum [ZMB]
Berlin N-4, Germany (DDR)

(268) Leningrad State University, Zoological Museum [ZML]
Leningrad V-164, USSR

(269) Universitetets Lund, Zoologisk Museum [ZMLU]
Lund, Sweden

(270) Moscow State University, Zoological Museum [ZMM]
Kerzenst. 6, Moscow K-9, USSR

(271) Georgian State Museum, Zoological Section [ZMT]
Tbilisi, GSSR, USSR

(272) Zoological Survey of India [ZSI]
Calcutta, India

(273) Zoologisches Sammlung des Bayerischen Staates [ZSM]
Munich, Germany

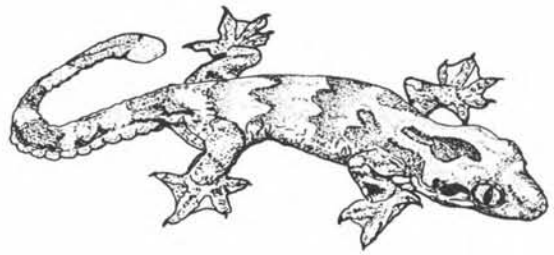
(274) Zoological Society of Philadelphia [ZSP]
Philadelphia, Pennsylvania, United States 19100

(275) Santa Barbara Museum of Natural History [SBMNH]
2559 Puesta del Sol Road, Santa Barbara, California, United States 93105

(276) National Museum of Wales, Department of Zoology [NMWZ]
Cathys Park, Cardiff, Wales CF1 3NP

(277) Merseyside County Museums [LIVCM]
William Brown Street, Liverpool, England L3 8EN

(278) Landessammlungen fuer Naturkunde [LNK]
Karlsruhe, Germany



Regional Society News

SSAR DIRECTORY OF REGIONAL HERPETOLOGICAL SOCIETIES

For the past several years the SSAR has published an annual list of Regional Herpetological Societies. The list that follows is the result of the Regional Herpetological Societies Liaison Committee's activities for the past year. Readers are asked to check the list for accuracy. Societies listed with no address, have had first class letters sent to that address returned. Any wrong addresses, disbanned societies, or missing societies should be brought to the attention of the Committee's chairman, John C. Murphy.

In 1981 the Committee is attempting to collect addresses and data on foreign organizations. If you are in contact with any foreign herpetological societies their addresses would be appreciated. Please send information to: John C. Murphy, 201 Peerless Dr., Plainfield, IL 60544.

ARIZONA HERP. ASSOCIATION
Carla Prach
3654 W. Shangri La
Phoenix, AZ 85031

ARKANSAS HERP. SOCIETY

ASSOCIATION FOR THE CONSERVATION OF TURTLES & TORTOISES
c/o Paul Surdez
432 Woodbury Dr.
Wyckoft, NJ 07481

BAY AREA AMPHIBIAN & REPTILE SOCIETY
3837 Huntington St.
Oakland, CA 68108

BAY AREA TURTLE & TORTOISE SOCIETY
P.O. Box 17
Berkeley, CA 91701

CALIFORNIA TURTLE & TORTOISE SOCIETY
Box 90252
Los Angeles, CA 90009

CANADIAN AMPHIBIAN & REPTILE CONS. SOCIETY
Barbara Froom
8 Preston Place
Toronto, Ont., Canada M4N 259

CENTRAL OHIO HERP. SOCIETY
2621 Muskingum Ct.
Columbus, Ohio 43210

CHICAGO HERPETOLOGICAL SOCIETY
2001 North Clark St.
Chicago, IL 60614

COLORADO HERPETOLOGICAL SOCIETY
P.O. Box 15381
Denver, CO 80215

CONNECTICUT HERP. SOCIETY

DALLAS HERPETOLOGICAL SOCIETY
Wayne Seifert
Dallas Museum of Natural History
P.O. Box 26193
Dallas, TX 75226

DESERT TORTOISE COUNCIL
350 Golden Shore
Long Beach, CA 90802

EASTERN SEABOARD HERP. SOCIETY
Malvin Skaroff
1025 Lakeside Ave.
Philadelphia, PA 19126

FLORIDA HERPETOLOGICAL SOCIETY
Dennis R. Magee
5488 North River Road
Jacksonville, FL 32211

FLORIDA WEST COAST HERP. SOCIETY
John Lewis
1312 South Evergreen Ave.
Clearwater, FL 33515

GEORGIA HERPETOLOGICAL SOCIETY
c/o Reptile House
Atlanta Zoological Park
800 Cherokee Ave. S.E.
Atlanta, GA 30315

GOPHER TORTOISE COUNCIL
c/o Florida State Museum
University of Florida
Gainesville, FL 32611

GREAT LAKES HERP. SOCIETY
c/o Jeff Gee
4308 N. Woodward
Royal Oaks, MI 48072

GREATER CINCINNATI HERP. SOCIETY
Cincinnati Museum of Natural History
172 Gilbert Ave.
Cincinnati, Ohio 45202

GULF COAST HERPETOLOGICAL SOCIETY
John Zapata
P.O. Box 1562
Houston Zoo
Houston, TX 77001

IOWA HERPETOLOGICAL SOCIETY
P.O. Box 191
Norwalk, Iowa 50211

KANSAS HERPETOLOGICAL SOCIETY
Museum of Natural History
University of Kansas
Lawrence, KS 66045

KENTUCKY HERPETOLOGICAL SOCIETY
John MacGregor
102 Fourth St.
Nickolasville, KY 40358

MARYLAND HERPETOLOGICAL SOCIETY
Natural History Society of Maryland
2643 North Charles Street
Baltimore, MD 21218

MASSACHUSETTS HERP. SOCIETY
P.O. Box 1082
Boston, MA 02103

MID-MISSISSIPPI VALLEY HERP. SOCIETY
Mike Lodato
925 Park Plaza Dr.
Evansville, IN 47715

NEBRASKA HERPETOLOGICAL SOCIETY
Jonny Martinez
2326 S. 12th St.
Omaha, NB 68108

NEW MEXICO HERPETOLOGICAL SOCIETY
Department of Biology
University of New Mexico
Albuquerque, NM 87131

NEW YORK HERPETOLOGICAL SOCIETY
David Hulmes
122 Second Ave.
Hawthorne, NY 07507

NORTH CAROLINA HERPETOLOGICAL SOCIETY
Patricia Ashton
North Carolina State Museum of
of Natural History
101 Halifax St.
Raleigh, NC 27611

NORTH NEW JERSEY HERPETOLOGICAL SOCIETY
P.O. Box 94
Augusta, NJ 07822

NORTHERN OHIO ASSOC. HERPETOLOGISTS
Department of Biology
Case Western Reserve University
Cleveland, OH 44106

OKLAHOMA HERPETOLOGICAL SOCIETY
Jeffrey Black
Oklahoma Baptist University
Shawnee, OK 74801

PALM BEACH COUNTY HERP. SOCIETY
Greg Longhurst
P.O. Box 125
Loxahatchee, FL 33470

PHILADELPHIA HERP. SOCIETY
John Robinson
ANSP, 18th and the Parkway
Philadelphia, PA 19103

SACRAMENTO VALLEY HERP. SOCIETY
Bob Pedder
6007 Watt Ave.
North Higlands, CA 95660

SAN DIEGO HERP. SOCIETY
P.O. Box 4439
San Diego, CA 92104

SAN DIEGO TURTLE & TORTOISE SOCIETY
c/o 6957 Tanglewood Road
San Diego, CA 92111

ST. LOUIS HERP. SOCIETY
P.O. Box 9216
St. Louis, MO 63117

SOUTH FLORIDA HERP. SOCIETY
Saul Friess
9972 N. Kendall Drive #54
Miami, FL 33176
San Fernando Valley Chapter

SOUTHWESTERN HERP. SOCIETY
P.O. Box 7469
Van Nuys, CA 91404

SOUTHWESTERN HERP. SOCIETY,
Inland Empire Branch
Bob Sanders
San Bernadino County Museum
2024 Orange Tree Lane
Redlands, CA 92373

TEXAS HERPETOLOGICAL SOCIETY
Barry Hinderstein
8739 Link Terrace
Houston, TX 77025

TOLEDO HERPETOLOGICAL SOCIETY
c/o Edward M. Schutte, Jr.
306 Hilary Lane
Toledo, OH 43615

TULAROSA BASIN HERP. SOCIETY
P.O. Box 1690
Alamogordo, NM 88310

UTAH HERPETOLOGICAL SOCIETY
Hogel Zoological Gardens
P.O. Box 8475
Salt Lake City, UT 84108

VIRGINIA HERPETOLOGICAL SOCIETY
WASHINGTON HERPETOLOGICAL SOCIETY
Scott Rae
317 Adahi Rd
Vienna, VA 21180
WESTERN MASSACHUSETTS HERP. SOCIETY
c/o Science Museum
236 State St.
Springfield, MA 01103
WISCONSIN HERPETOLOGICAL SOCIETY
Milwaukee Public Museum
800 West Wells
Milwaukee, WI 53233 ●

BRITISH HERPETOLOGICAL SOCIETY

The British Herpetological Society (BHS), apparently the oldest herpetological society in Europe (founded 1947), aims "to promote the study and protection of amphibians and reptiles, particularly of the European species." The Society is based with the Zoological Society of London. Membership includes both professional and amateur herpetologists and at present totals about 700 members and a further 200 subscribers to the Society's journal, the *British Journal of Herpetology*. Issues of the journal, together with the *BHS Bulletin*, are distributed twice yearly. Eight meetings, held at the Linnaean Society of London, Piccadilly, are organised yearly with supplemental meetings for specialised interests. The BHS "Conservation Committee" (founded 1969) carries out conservation measures for Britain's threatened species in liaison with the UK Government's Nature Conservancy Council. Past work has been funded by the World Wildlife Fund (British National Appeal). The BHS "Captive Breeding Committee" (founded 1976) is coordinating information from Society members on the successful breeding and rearing of species in captivity as a conservation tool, and distributes free leaflets for individual groups and species of amphibians and reptiles. Society members have assisted in providing data for an atlas of species' distribution in the British Isles (1973) and now for the production of a European distribution atlas. An interest is also taken in work by herpetologists in Commonwealth and other English speaking Countries.

Society officers:
President: Dr. J. F. D. Frazer
Joint Secretary: Dr. M. R. K. Lambert
Joint Secretary (administration):
Mr. P. A. W. Bennett
(Treasurer: Mr. D. G. D. Lucas)
Editor, *Br. J. Herpet.*: Dr. M. Peaker
Librarian/Joint Editor, *BHS Bulletin*:
Mr. J. Pickett
Chairman, Conservation Committee:
Dr. T. J. C. Beebee
Chairman, Captive Breeding Committee/
Joint Editor, *BHS Bulletin*:
Mr. S. Townson
Education Officer: Mr. V. F. Taylor

Communications are usually in English, but papers in French, German or Spanish may be accepted by the Editors of the journal and bulletin. Foreign members are most welcome. For information and applications for membership (£5.00 at present), write to: The Secretary, British Herpetological Society, c/o Zoological Society of London, Regent's Park, London NW1 4RY, U.K.

HERPETOLOGICAL STUDY OPPORTUNITIES AT OHIO UNIVERSITY (ATHENS)

The zoological faculty and graduate program at Ohio University have been relatively small until recently. Over the past three years the faculty has doubled in number because of a teaching association with the new College of Osteopathic Medicine. Because most of the new faculty are young and pursuing active research programs, the graduate student program should grow in national reputation. Excellent opportunities for the study of reptiles and amphibians are also available in the form of two faculty members, new research facilities, a collection of reptiles and amphibians and many natural environmental areas.

Henri Seibert is the senior herpetologist and Professor of Zoology. He teaches courses in Herpetology, Ornithology and Field Ecology. He has built a large teaching and research collection of reptiles and amphibians from Ohio and the Appalachian Regions. His knowledge of the distribution and natural history of local species is tremendous. Currently he is receiving research support from the Ohio Division of Wildlife and is conducting population studies on several salamander species.

Scott Moody is the junior herpetologist and has joined the faculty this year as Assistant Professor of Biomedical Science. He just completed his doctoral dissertation entitled "Phylogenetic and historical biogeographical relationships of the genera in the family Agamidae (Reptilia: Lacertilia)" at the University of Michigan in Ann Arbor. His research and teaching interests are: lizard phylogenetics and biogeography, narrow hybrid zone phenomena, karyology of lizards, behavior and reproductive isolating mechanisms of lizards and frogs, comparative anatomy of the skeleton, muscles of the pectoral girdle and nerve pathways of the limbs of lizards, comparative histology of epidermal glandular structures of lizards and lizard fossils of the Mesozoic.

A temperature-controlled animal research facility is available on campus. Moody will have available in his laboratory a Wild dissecting scope with camera lucida and Nikon camera mount, a compound binocular microscope for histology and karyology, soft X-ray machine, reel-to-reel tape recorder, slow motion movie camera and analyzer and a video computer terminal. In other laboratories, transmission and scanning electron microscopes and sonagram machines for analyzing animal sounds are available. The University has an IBM/370 digital computer.

Non-herpetological faculty who could directly benefit students of herpetology include Gerald Svendsen who studies the sociobiology and evolutionary ecology of mammals and Joseph Eastman who studies the evolution, ecology, anatomy and physiology of Antarctic fishes.

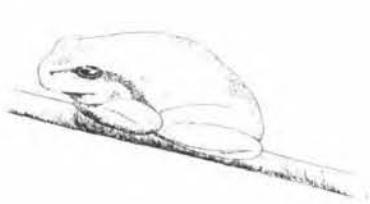
Students interested in all aspects of the biology of reptiles and amphibians are encouraged to apply to the M.S. and Ph.D. programs.

SCOTT M. MOODY
Department of Zoology and COM
Ohio University
Irvine Hall
Athens, Ohio 45701 ●

POSITIONS

BIRD/HERP PREPARATOR

Carnegie Museum of Natural History has a vacancy for a **Scientific Preparator** for the Section of Birds and the Section of Amphibians and Reptiles. Starting salary will be $12,792., plus benefits. Candidates should have a B.S. in vertebrate biology, or equivalent work experience. A thorough knowledge of preparation techniques for scientific specimens of birds (study skins, fluid preserved, skeletons) and amphibians and reptiles (fluid preserved, skeletons), and the ability to record and transcribe data accurately and legibly are essential. Job experience in a scientific collection is **required.** In addition to preparation duties, the position will involve assisting with the management of the collections (installation and arrangement of specimens, packing and unpacking shipments, fumigation, etc.), and opportunities to participate in field work. Experience in field collecting of birds, amphibians and reptiles is desirable, but not required. **This is not a research position.** Send curriculum vitae and the names and telephone numbers of two references to Dr. C. J. McCoy, Section of Amphibians and Reptiles, Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, PA 15213. The position will be filled after 1 January 1981. Carnegie Institute is an Equal Opportunity Employer.



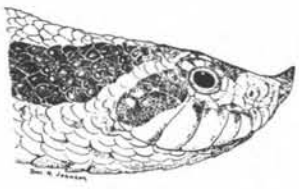
Legislative Alert

The following amphibians and reptiles are currently (*i.e.*, as of 1 **October** 1980) listed under the Endangered Species Act of 1973 (as amended) and/or the CITES Treaty. Persons involved in "activities" with these species are required to possess the appropriate permits/certificates.

	U.S. List	CITES Appendix
AMPHIBIA		
Ambystoma dumerilii		2
Ambystoma lermaensis		2
Ambystoma macrodactylum croceum	E	
Ambystoma mexicanum		2
Andrias davidianus davidianus	E	1
Andrias davidianus japonicus	E	1
Atelopus varius zeteki	E	1
Batrachoseps aridus	E	
Bufo houstonensis	E	
Bufo periglenes	E	1
Bufo retiformis		2
Bufo superciliaris	E	1
Discoglossus nigriventer	E	
Eleutherodactylus jasperi	T	
Eurycea nana	T	
Hyla andersoni	E	
Leiopelma hamiltoni	E	
Megalobatrachus davidianus davidianus	E	1
Megalobatrachus davidianus japonicus	E	1
Nectophrynoides spp.	E	1
Phaeognathus hubrichti	T	
Typhlomolge rathbuni	E	
REPTILIA		
Acrantophis spp.		1
Alligator mississippiensis	E	2
Alligator mississippiensis	T	2
Alligator sinensis	E	1
Alligatoridae		2
Amblyrhynchus cristatus		2
Ameiva polops	E	
Anolis roosevelti	E	
Batagur baska	E	1
Boidae		2
Bolyeria multocarinata	E	
Bolyeria spp.		1
Brachylophus fasciatus	E	
Brachylophus spp.	E	
Caiman crocodilus apaporiensis	E	1
Caiman crocodilus chiapassius		2
Caiman crocodilus crocodilus		2
Caiman crocodilus fuscus		2
Caiman crocodilus yacare		2
Caiman latirostris	E	1
Caiman yacare	E	
Caretta caretta	T	1
Casarea dussumieri	E	
Casarea spp.		1
Chamaeleo spp.		2
Chelonia depressa		2
Chelonia mydas	E	1
Chelonia mydas	T	
Cheloniidae		2
Chersina spp.		2
Chrysemys rubriventris bangsi	E	
Clelia cloelia		2
Clemmys muhlenbergi		2
Cnemidophorus hyperythrus		2
Conolophus pallidus	E	2
Conolophus spp.		2
Conolophus subcristatus		2
Constrictor constrictor		2
Crocodilurus lacertinus		2
Crocodylidae		2
Crocodylus acutus	E	1
Crocodylus cataphractus	E	1
Crocodylus intermedius	E	1
Crocodylus johnsoni		2
Crocodylus moreletii	E	1
Crocodylus niloticus	E	1
Crocodylus novaeguineae		2
Crocodylus novaeguineae mindorensis	E	1
Crocodylus palustris		1
Crocodylus palustris kimbula	E	
Crocodylus palustris palustris	E	
Crocodylus porosus	E	2
Crocodylus rhombifer	E	1
Crocodylus siamensis	E	1
Crotalus willardi obscurus	T	
Crotaphytus silus	E	
Cyclagras gigas		2
Cyclura pinquis	E	
Cyclura spp.		2
Cyclura stejnegeri	T	
Cyrtodactylus serpensinsula		2
Damonia hamiltoni	E	1
Dermochelys coriacea	E	1
Dracaena guianensis		2
Drymarchon corais couperi	T	
Elachistodon westermanni		2
Epicrates cenchris cenchris		2
Epicrates inornatus	E	1
Epicrates monensis granti	E	1
Epicrates monensis monensis	T	
Epicrates subflavus	E	1
Eretmochelys imbricata	E	1
Eunectes notaeus		2
Gavialis gangeticus	E	1
Geochelone elephantopus	E	1
Geochelone geometrica	E	1
Geochelone radiata	E	1
Geochelone spp.		2
Geochelone yniphora	E	1
Geoclemmys hamiltoni	E	1
Geoemyda tricarinata	E	1
Gopherus agassizii	T	
Gopherus flavomarginatus	E	1
Gopherus spp.		2
Heloderma horridum		2
Heloderma spp.		2
Heloderma suspectum		2
Homopus spp.		2
Hydrodynastes gigas		2
Iguana spp.		2
Kachuga tecta tecta	E	1
Kinixys spp.		2
Klauberina riversiana	T	
Lepidochelys kempi	E	1
Lepidochelys olivacea	E	1
Lepidochelys olivacea	T	1
Lissemys punctata punctata	E	1
Malacochersus spp.		2
Melanochelys tricarinata	E	1
Melanosuchus niger	E	1
Morenia ocellata	E	1
Nerodia fasciata taeniata	T	
Nicoria tricarinata	E	1
Osteolaemus tetraspis		1
Osteolaemus tetraspis osborni	E	1
Osteolaemus tetraspis tetraspis	E	1
Paleosuchus trigonatus		2
Paradelma orientalis		2
Pelomedusa subrufa		3
Pelusios spp.		3
Phelsuma newtoni	E	
Phelsuma quentheri	E	
Phelsuma spp.		2
Phrynosoma coronatum blainvillei		2
Podocnemis expansa	E	
Podocnemis spp.		2
Podocnemis unifilis	E	
Psammobates geometrica	E	1
Pseudemydura umbrina	E	1
Pseudemys rubriventris bangsi	E	
Pseudoboa cloelia		2
Python molurus molurus	E	1
Pyxis spp.		2
Sanzinia madagascariensis		1
Sauromalus varius	E	
Sphenodon punctatus	E	1
Terrapene coahuila	E	1
Testudinidae		2
Testudo elephantopus	E	1
Testudo radiata	E	1
Testudo spp.		2
Testudo yniphora	E	1
Thamnophis couchi hammondi		2
Thamnophis elegans hammondi		2
Thamnophis sirtalis tetrataenia	E	
Tomistoma schlegelii	E	1
Trionyx ater	E	1
Trionyx gangeticus	E	1
Trionyx hurum	E	1
Trionyx nigricans	E	1
Trionyx triunguis		3
Tupinambis spp.		2
Uma inornata	T	
Uromastyx spp.		2
Varanus bengalensis	E	1
Varanus flavescens	E	1
Varanus griseus	E	1
Varanus komodensis	E	2
Varanus komodoensis	E	2
Varanus spp.		2

Don't jeopardize yourself or your specimens by failing to comply with Federal and State permit requirements.

THOMAS J. BERGER
Museum of Natural History
The University of Kansas
Lawrence, Kansas 66045



BOOK REVIEWS

International Zoo Yearbook - Volume 19. P. J. S. Olney, Ed. 450 pp. Published 1979 The Zoological Society of London. $34.00 Hardbound; $27.00 Softcover.

What's covered with baby *Crocodylus* and adult *Thelotornis* and is something everyone working with a living herp collection should have? Wrong—it's not a Pierre Cardin motorcycle seat.

Volume 19 of the International Zoo Yearbook presents, as usual, an excellent collection of papers covering a broad spectrum of exotic animal husbandry. The price, while rather steep in absolute terms, is not unreasonable compared to $75.00 volumes in other series. The 126 pages of herpetological material cover everything from exhibition techniques to anaesthetics, though the bulk of the section deals with breeding of various species.

A note on "Improving the calcium content of mealworms" (p. 254), while not included in the reptile section, should not be overlooked (the technique would probably work with many insects used as food). Similarly, Huff's note on facilities of the Reptile Breeding Foundation (p. 267) is interesting.

The non-herpetological papers contain a wealth of information for those herpetologists interested in general animal behavior or reproductive biology.

GEORGE R. PISANI
Biology Department
University of Kansas
Lawrence, KS 66045

●

Red Book of USSR - Rare and endangered specimens of animals and plants.
Editor: A. Boradin Editorial Board: Ziljarov, Sokolov, Tahtadjan, Cicin, Brejnev Borodin Ministry of Agriculture of USSR. Moscow, 1978.
This book is not commercially available, but is in USSR scientific libraries and institutes. (Government Organization) The list of amphibians and reptiles includes illustrations, information about range, reproductive biology, and abundance of the following species:

AMPHIBIA
- Caudata
  - *Ranodon sibiricus* - rare, endemic
  - *Onychodactylus fisheri* - rare, poorly known
  - *Mertensiella caucasica* - rare endemic
  - *Triturus montandori* - becoming rarer
  - *Triturus vittatus ophryticus* - rare endemic, poorly known
- Anura
  - *Pelobates syriacus* - endemic, small range
  - *Pelodytes caucasicus* - rare, poorly known
  - *Bufo calamita* - rare, becoming rarer

REPTILIA
- Testudines
  - *Trionyx sinensis* - becoming rarer through human activity, slow reproduction
  - *Testudo graeca* - becoming rarer through overcollecting, slow reproduction
- Aquamata (Sauria)
  - *Zymnodactylus kotsehiyi damilewski* - rare, small range
  - *Alzophylax spinicauda* - rare, poorly known
  - *Eublepharis turemenicus* - rare, small range, poorly known
  - *Agama ruderata* - rare, small range
  - *Phrynocephalus maculatus* - small range (isolated population), rare
  - *Phrynocephalus rossikowi* - reproduction small, poorly known, sporadically located populations, small range
  - *Varanus griseus caspius* - reduced in number through intensive collecting and killing
  - *Eumeces latisculatus* - rare, small range
  - *Ablepharus kitaibelii chernowi* - small range, small number
- Squamata (Serpentes)
  - *Ptyas mucosus* - reduction of numbers as result of intensive collecting
  - *Elaphe situla* - small range, reduction of number as result of collecting and killing, probably will be extirpated in USSR
  - *Elaphe longissima* - patchy distribution, rare, killed by man
  - *Oligodon taeniolatus* - very rare, small range
  - *Rhynchocalamus melanocephalus saturini* - small range, rare, poorly known
  - *Naja naja oxiana* - rare, reduction of number by intensive collecting and killing
  - *Vipera kaznakowi* - small range, poorly known
  - *Vipera ammodytes transcaucasiana* - sporadic local populations, small range and abundance
  - *Vipera (xanthina) raddei* - decrease of numbers, small range, relatively small populations

The decrease in number of a species is caused by collecting, by destruction of biotopes and unknown reasons. Red Book Specimens are protected by local law and limited in collecting for sale, exhibit, etc.

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The editor thanks Fran Williams for typing the manuscript.

BOOK REVIEW

McKeown, S. 1978. **Hawaiian Reptiles and Amphibians.** Oriental Publishing Co. 80pp. ill. Obtainable from ISBS, PO Box 555, Forest Grove, OR 97116. $3.50.

Of the 4 Amphibia and 18 reptiles presently occurring in Hawaii or its surrounding waters, only the sea snake and the three marine turtles can be considered indigenous. Seven species of lizards were probably present in Hawaii before the arrival of Captain Cook, possibly transported unintentionally by the early Polynesians. The remainder of the herpetofauna is the result of man's recent activities, including escapees from pet shops and purposeful introductions. Thus, 148 adult *Bufo marinus* were introduced onto Oahu in 1932 and two years later their number had swelled to over 100,000! Other introductions apparently failed.

For each species there are brief notes on life history, identification and distribution and each species is illustrated by one or more photographs which are outstanding in their clarity and color rendition. These superb pictures alone are worth obtaining the booklet even if you never visit Hawaii.

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●

TECHNIQUES

AN IMPROVED DESIGN FOR A THREAD TRAILING DEVICE USED TO STUDY TERRESTRIAL MOVEMENTS OF TURTLES

Thread trailing devices designed to study the terrestrial movements of turtles have been used by several workers (see Dolbeer, 1971; Reagan, 1974; and Schwartz and Schwartz, 1974; among others). Although varying in detail, all of these involve a source of friction created by a spool of thread mounted on a horizontal shaft or axle. The device described below eliminates this source of friction by eliminating the need for an axle. It was conceived and successfully utilized after difficulty was encountered with an axle-type device being used to study the terrestrial movements of individuals of *Kinosternon subrubrum* (Scott, 1976).

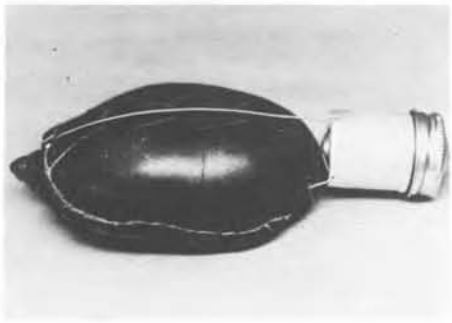


Fig. 1. Trailing device attached to carapace of adult male *Kinosternon subrubrum*.

This new device consists of a light-weight spool of fine thread mounted lengthwise inside an empty 35 mm aluminum film canister, which can be fastened to the posterior portion of the turtle's carapace using three small wires (Fig. 1). The canister contains a thread-release mechanism similar to those employed in commercial spincast fishing reels, which are noted for their low-friction casting quality. The device is sketched in detail in Fig. 2.

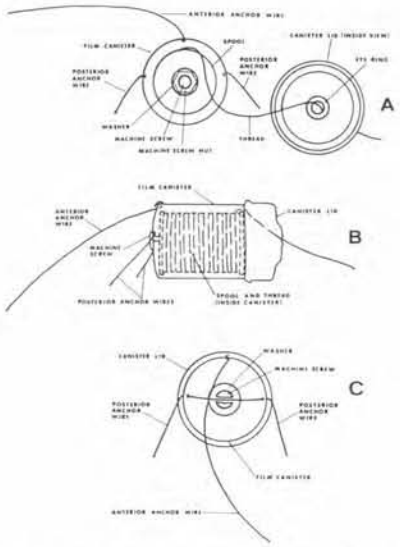


Fig. 2. Diagram of trailing device showing details of construction. A. Posterior view of canister with lid removed. B. Lateral view showing position of spool inside. C. Anterior view.

Commercially available polyester thread wound on a 114 m (125 yards) capacity styrofoam spool is recommended for use in the device. Round-headed steel machine screws (1.5 inches X 8/32) and the matching washers and hexagonal machine screw nuts can be used to anchor the spool to the inside of the canister. An eye ring should be installed on the inside of the lid of the canister to afford a smooth opening through which the thread can trail.

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UNDERWATER TRAPS FOR AQUATIC TURTLES

The chicken wire trap described by Iverson (1979) has decided advantages (primarily cost and cleanliness) over the hoop net described by Legler (1960) but appears to be somewhat more difficult to transport. Both utilize tapered throats at either end of the trap and are effective for the collection of aquatic turtles. This paper discusses variations in design of hoop nets for turtles and compares them to chicken wire traps.

Throats. All commercial turtle nets I have seen are single throated. The other end may have a draw-string release for easy access to the turtles. Nets made with a throat at either end (Fig. 1) may be set parallel with the shore line to increase accessibility to feeding turtles. They have the disadvantage of providing two openings through which turtles may escape. A length of seine twine threaded through the throat acts as a purse string to control the size of the opening. Legler (*op. cit.*) found a ten inch long by three inch high ovoid to be adequate. The shape of the opening is flexible permitting turtles with shells deeper than three inches to enter the trap. Indeed, I have removed snapping turtles from traps having throats seemingly too small to admit them. Two lines attached to the purse string and edge meshes of the throat on opposite sides hold the throat in position and keep the opening in the form of a pointed-ended oval. The other ends of these lines are attached to either the wall of the trap or to the interior hoop or hoops. In a four-hoop trap, attachment is to the second hoop from the opposite end. The lines should be as nearly horizontal as possible when the traps are set. Making one of the purse strings with a non-sliding loop on either end and attaching the lines to this throat with "clothespin" snaps (sold for sport or commercial fishing) allows one end to be opened easily to facilitate removal of large turtles. One of the snaps holds the two loops of the purse string and two meshes at the edge of the throat; the other is attached to the mesh only. After removal of a turtle, the purse string must be re-threaded through the meshes at the edge of the throat but the time expended on this chore is far less than that expended on trying to remove a 35-pound snapping turtle from a trap without opening the throat. Number 4 or 5 snaps are easy to work with.

Hoops. Round hoops are standard and easier to form. Oval hoops, although harder to form, have compensating advantages. Traps built around oval hoops show less tendency to roll and can be set in shallower water.

Three or four hoops are usually used. With four hoops, the lines holding the throats may be attached to the hoops for strength. Three-hoop traps are lighter and provide a center attachment for the line running from the trap to the shore or other attachment. With this arrangement, the traps can even be suspended in deep water.

Hoops may be made of wood, fibreglass, aluminum, or galvanized steel. Wood is bulky and does not last well. Fibreglass hoops are expensive and must be tied to the trap walls, rather than threaded through the mesh. Legler *(op. cit.)* recommended quarter-inch aluminum tubing. Aluminum rod of the same diameter can also be used. Aluminum hoops are light in weight and easily bent into the desired shape. They have the disadvantage of being easily damaged. Galvanized steel is heavier and somewhat harder to form (buying it in a coil helps) but is almost indestructible when properly galvanized. The ends of the metal hoops are joined by couplings or sleeves of tubing and crimped with pliers or with a hammer and metal punch. Advantages and disadvantages of the two metals are as mentioned above. Copper tubing seems to share the disadvantages of each. The choice of material depends upon the trapping conditions. If the traps can be carried by car to the trapping site, the durability of galvanized steel is desirable. If the trappers must carry the traps any considerable distance to the water, the light weight of aluminum becomes more important.

Mesh. In 1960, Legler recommended cotton webs. Since then cotton has almost entirely given way to nylon. Nylon will neither rot nor pick up much water but it benefits from treatment with a product such at "Netcoat" which is supposed to improve strength and abrasion resistance. Creosoted or tarred nets have the disadvantage of leaving the hands black and hard to clean.

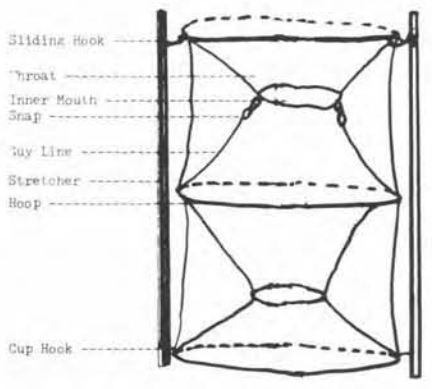


Figure 1. Double throated hoop net, seen from above, showing use of snaps on one pair of guy lines for quick release of large turtles.

Mesh size will usually be three-quarters of an inch square measure (an inch and a half stretched measure) unless hatchlings must be taken. Then half inch square mesh becomes necessary despite the added weight, expense, and difficulty of repair.

Stretchers. Some form of tension member is required to keep the hoop net extended. Stakes are bulky (four are required) and may hold poorly in soft mud. Laths with L-hooks in either end have been tested and shown to have drawbacks. Slightly undersized traps can be stretched with laths because the latter will bow out. Oversized traps can sometimes be stretched by adding a third lath to the usual two but the traps often sag anyway. Legler *(op. cit.)* described a non-adjustable stretcher of half inch dowel with a screw hook in either end. He also described an adjustable one with a screw hook soldered to a copper sleeve which slides along the dowel, forming a friction sleeve. A screw hook at one end of the dowel and a screw at the other keep the friction sleeve from falling off. Legler later changed to L-hooks soldered to metal washers for his sliding friction sleeves. A more easily manufactured friction sleeve consists of a brass closed S-hook, just large enough so that one loop can slide freely over the dowel. The other loop is opened into an "L" shape with pliers and rotated 90 degrees. A similar device can be bent from wire of roughly the same diameter as that in a wire coat hanger, *e. g.* single strand aluminum guy wire (Fig. 2). The stretcher is assembled in the usual manner with a brass cup hook or screw hook at one end, the friction sleeve in the middle, and a brass screw at the other end. Drilling pilot holes for the screws helps to avoid splitting the dowel. Legler *(op. cit.)* suggested painting, varnishing, or lacquering the dowels to prevent their soaking up water and warping. I have had good results soaking them in linseed oil to waterproof them.

As dowels are readily available only in three foot lengths, this places an upward limit on the length of the hoop net. Garden shops, however, may have dahlia stakes, which are longer and are also suitable for trap manufacture.

Size of Trap. Legler *(op. cit.)* found hoop nets 19 inches in diameter (five feet in circumference), 33 inches long, and with 12 inch throats to be the most useful in general collecting. This length has the advantages of permitting the use of standard dowels as stretchers and is also short enough to permit the operator to reach in and change the bait easily. The dimensions can be modified for specialized collecting.

Bait Holders. One of the cheapest and most readily available bait holders, described by Legler *(op. cit.)*, consists of a square of quarter inch mesh hardware cloth folded around the bait and suspended in the center of the trap just above the throats. These and ones made of window screening are sharp edged and can quickly shred the fingers. Plastic vials, two inches in diameter and three and a half inches high make adequate if short-lived bait holders. The cap is suspended from the middle of the trap by a short cord and may be weighted by a three-eighths ounce lead sinker. The vial itself, perforated by 20 or so quarter inch holes, can be filled with bait and quickly snapped on the lid. The life span of these bait holders is about one or two months of daily use. If bait is abundant, you can use the commercial snapper trappers' technique of simply throwing half a large carp into the trap unless there are reasons (Iverson, *op. cit.*) for not allowing the turtles to feed on the bait.

Tie Lines. Where the trap is set by throwing it from shore, or must be anchored, a leash of 12 to 15 feet of heavy nylon seine twine (about 0.2 inch diameter) can be attached to the middle hoop. Attaching it with a large clothespin snap (as found on some fish stringers) allows quick removal of the leash when not needed.

Materials. One style of hoop net may be made with:

A) Three-quarter inch square nylon netting, four by four and a half feet. This makes a net 32 inches long with 11 inch throats. Circumference is four feet. To make a larger or smaller diameter net, vary the four foot width of the mesh and the circumference of the hoops.
B) Twelve feet of hoop material, quarter inch diameter.
C) Three couplings for hoops.
D) Two half inch dowels.
E) Two brass S-hooks large enough to slide along the dowels or about 10 inches of heavy aluminum wire.
F) Two small brass round-head screws.
G) Two brass screw hooks or cup hooks.
H) Two number 4 or 5 clothespin snaps.
I) 12 to 15 feet of 0.2 inch diameter nylon seine twine.
J) Nylon seine twine to match that used in the mesh.
K) Bait holders.
L) Materials to treat dowels and mesh.
M) Large clothespin snap (optional).

Comparison of Traps. Materials for the Iverson chicken wire trap are half as costly as those for a hoop net (galvanized steel hoops, one inch square nylon mesh). In addition, they may be assembled in a quarter of the time (half an hour vs. two hours). Their non-absorbency allows them to be transported from the trap site cleaner and less smelly than hoop nets. Single-unit construction limits losses of parts.

Determination of relative durability and trapping efficiency of the two styles of trap could best be made by people who have fished both styles in the same habitats. Durability, at least, may vary with habitat. For example, brackish water accelerates both rusting and galvanic action.

Hoop nets appear to be far the easier to transport. Weight of the two traps is roughly equal (about three pounds) when galvanized steel rod is used. Use of aluminum tubing cuts the weight of the hoop net to between one third and one half of that of the chicken wire trap. The difference in volume of the collapsed traps is more striking, the hoop nets occupying one fifth of the space of a chicken wire trap. In addition, hoop nets collapse by themselves when the stiffeners are removed and need not be compressed.

Hoop nets appear to have advantages over

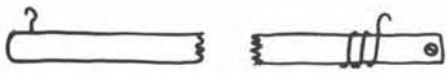


Figure 2. Stretcher for hoop net. It consists of a half inch dowel, screw hook, sliding wire hook, and round head screw (as stopper).

chicken wire traps for trapping very small turtles in that smaller mesh is available for the webbing. If large turtles are present, whether wanted or not, the hoop nets appear far superior. Whereas large snapping turtles have everted the funnels of chicken wire traps to escape, the lines holding the throats of hoop nets keep the turtles securely within the nets. Attaching these lines to one of the throats with snaps (clothespin hooks) allows the turtle's quick removal from the trap. Muskrats, on the other hand, usually gnaw their way through the mesh and repairs to the web of a hoop net take a minute or two.

When cost of materials and speed of assembly are important and the traps can be driven up to the site, the chicken wire traps are the better. When traps must be transported by boat or packed in to the site, the hoop net becomes desirable.

ACKNOWLEDGEMENTS

I am indebted for some of the above net modifications to James L. Christiansen and John M. Legler. Some fo the modifications were developed and tested while working for LGL Environmental Research Associates in southeastern Iowa. During the course of the study, we trapped every kind of turtle reported from the area, exclusive of *Macroclemmys*, the alligator snapping turtle, which is rare if present at all.

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Herpetological Husbandry

This section of **Herpetological Review** deals specifically with the husbandry of captive reptiles and amphibians. Articles concerning any aspect of successful exhibit design, techniques for maintenance and breeding, egg incubation, and rearing of the young are acceptable based on the success of the husbandry program, the quality of written work, and the overall value of the presented material to the herpetological community. Reproductive articles should stress the actual methods and specimen manipulation involved but may also include observations of behavior, growth, and statistical data. Of particular interest are reports describing consistently successful, long term programs which deal with large numbers of a single species or genus.

Longer husbandry manuscripts should be divided into appropriate sections including Literature Cited. Black and white photos and line drawings are acceptable. All manuscripts will be reviewed by the Section Editor, and frequently by another individual within the particular area of expertise. Reports which do not deal with herpetological husbandry *per se* (for example, the description of eggs and young from a wild-caught gravid female) will be forwarded to the Editor for consideration as a Feature Article. In order to reduce publication time, husbandry articles should be sent directly to the Section Editor, Bern W. Tryon, Dept. of Herpetology, Houston Zoological Gardens, Houston, Texas 77001.

CAPTIVE PROPAGATION OF ENDANGERED HOUSTON TOADS

Two years ago the Houston Zoo received a $2,170 grant from the U.S. Fish and Wildlife Service for a captive propagation/release program of the endangered Houston toad *(Bufo houstonensis)*.... To help increase the wild population, the Houston Zoo proposed to raise the toads from eggs to adults in a laboratory situation.... The laboratory-raised adult toads could then be released to enhance the breeding potential of the wild population.

The Zoo was highly successful in raising tadpoles, with mortality rates of only 9% in 1978 and 5% in 1979. Problems were encountered in raising the toads, however, so several experimental groups were established to determine the best possible conditions for the toad's survival. It was found that toads raised in naturally planted outdoor enclosures grew faster and demonstrated a significantly lower death rate than those raised indoors.

This year the Zoo was awarded a two-year grant of $21,878.52 to continue its research on the Houston toad. The grant financed the development of an outdoor off-exhibit propagation area at the Zoo. The area contains greenhouses with removable roofs and sides. The roofs and sides are placed on the enclosures only during inclement winter weather. Personnel and assorted equipment are also supplied through grant funds.

Controlled experiments are being conducted to determine why the toads survive better outside than those housed inside....

The University of Texas permitted the use of several one-acre outdoor toad enclosures in which to raise Houston toads. Marked toads will be released at designated sites when they reach the age of one year. Those released will be from both the Zoo and the University of Texas. By comparing the survival of released toads from both sources, the most successful release program can be designed.

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....AAZPA Newsl. 21(5) 1980.

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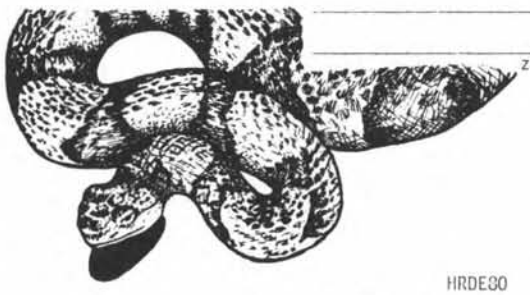
Autecology of the Copperhead

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CAPTIVE REPRODUCTION OF *VIPERA RUSSELLI* (SHAW, 1797).

Bibliographical data about the reproduction of *Vipera russelli* refer mainly to observations carried out in captivity. They are generally fragmentary and incomplete (Bannerman, 1907; Flynn, 1932; Sochurek, 1949; Robinson and Woodward, 1955; Meyer-Holzapfel, 1969).

The conditions under which vipers are kept in our breeding colony have already been described in detail (Naulleau, 1973 b). Briefly, vipers are kept in laboratory in large terraria, 3.80 m long, 2.25 m wide and 1.05 m high, along with cages 0.50 m or 1 m long, 0.50 wide and 0.50 high. Weather conditions are about the same all the year. A thermal gradient between 18 and 50° C from 8 a.m. to 8 p.m. enables the vipers to choose their optimum temperature. Photoperiod is from 8 a.m. to 8 p.m. During the night, the temperature is kept to at least 18° C with permanent heating.

The vipers are mainly fed with micromammalia, especially rats *(Rattus norvegicus)*, and mice *(Mus musculus)*, and also chicks *(Gallus gallus domesticus)*.

The biology of Russell's viper bred under those conditions has been published (Naulleau and van den Brule, 1979). The first litters observed in the laboratory were obtained from pregnant females imported from Pakistan. We are now dealing with the 2nd captive bred generation.

A. Sexual maturity

With *Vipera russelli*, as with all ophidia, sexual maturity is late. If we take into account the period included between the earliest mating and parturition, the birth of young vipers from a viper born and bred in laboratory occured at the age of 23 months.

B. Sexual behaviour and mating

This species does not show a particular behaviour as compared with other vipers. Pairing by means of "dances" between male and female, and fights between males, do not occur.

In sexual behaviour, the male explores the female's body with quick strokes of the tongue as he is moving on it or along it with jolting movements, while the female is extremely passive. Then, the male twines its tail round the female's so that both cloacae join for mating. Only one hemipenis takes part in mating, which generally lasts a long time.

C. Parturition

The following information is from snakes raised in our colony. In Fig. 1 and 2, we have showed the weight and size growth of N° 7 male, who mated with 3 different females and of N° 2 female who was the first to give birth to young vipers in laboratory. Important biological events (shedding, mating, litters) have also been mentioned in these figures together with the monthly food intake. Notice that three of the observed matings took place at the beginning of the year (in January and February) (Table 1 and Fig. 1). Three matings were carried out between brother and sister.

In Fig. 3, we have mentioned the months when parturitions cited in the literature occurred, along with the dates of the litters obtained in the laboratory from pregnant females from Pakistan, and 3 laboratory born females. Parturitions take place from April to September with a conspicuous maximum in July, and this with vipers that were kept in captivity in very different regions and under undoubtedly dissimilar conditions, not mention in the literature. Moreover, Wall (1921), quoted by Saint-Girons (1972) reports that in Ceylon and peninsular India, parturition generally takes place in June or July. On the other hand, in Indonesia, births take place from January to March (van Hoesel, 1958). According to Robinson and Woodward (1955), the birth of 23 young vipers lasted more than 30 hours. We were able to observe one litter only, with N° 13 female; all other births took place in our absence. Parturition of 11 young vipers and 8 infertile eggs took place 4 h 25 mn and proceeded as follows (from 9 h 45 a.m.): 1° young viper: 2° infertile egg; 3° young viper; 4°: 2 infertile eggs; 5°: 2 young vipers; 11 h 05 a.m.: 6° young viper; 7° infertile egg; 11 h 56: 8°: 2 infertile eggs; 12 h 05: 9° infertile egg; 10° young viper; 12 h 25: 11° young viper; 12 h 40; 12° young viper; 1 h 05 p.m.: 13° young viper; 1 h 40 p.m.: 14° young viper; 2 h 10 p.m.: 15° infertile egg and 16° young viper.

Russell's viper is a prolific snake since it can produce from 20 to 63 young vipers measuring from 212 to 275 mm (Angel, 1950). In Ceylon and in Peninsular India, the number of young vipers for each litter varies from 9 to 63 (Wall, 1921, quoted by Saint-Girons, 1972). In captivity, we have recorded litters of 8 to 22 young vipers with an average of 15.4, and from 0 to 9 infertile eggs, with an average of 5.4 (Table 2). There is an average of 8 females for 5.9 males in a litter, which gives a sex-ratio of 1.3 in favour of the females.

The length of the young vipers born in the laboratory fits more or less with the literature data which give 235 mm and 290 mm as extreme values (Flynn, 1932; Robinson and Woodward, 1955; Meyer-Holzapfel, 1969) (Table 3), our minimum (165 mm) and maximum (320 mm) being nevertheless a little different. The sizes and weights of young vipers

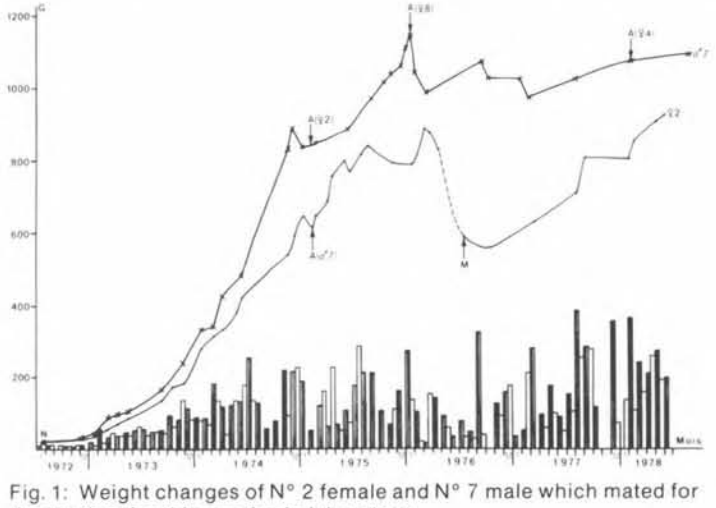


Fig. 1: Weight changes of N° 2 female and N° 7 male which mated for the 1st time for this species in laboratory.
age in months and years on the X - axis.
weight in grams on the Y - axis.
A: mating
B: parturition
C: birth of young vipers
Between brackets : complementary individual to the mating
Histogramm : weight of monthly food intake
lined bars : male
blank bars : female

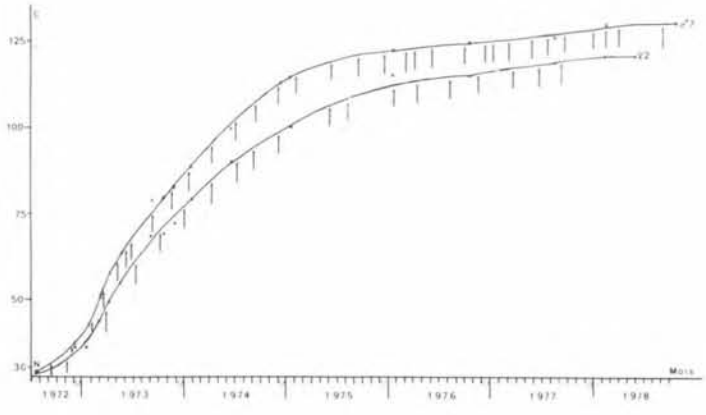


Fig. 2: Graph of size growth of N° 7 male and N° 2 female which mated for the 1st time for this species in laboratory.
age in months and years on the X - axis
size in cm on the Y - axis
arrows indicate sheddings
N : Birth of vipers

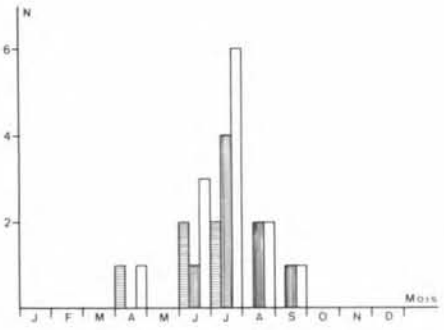


Fig. 3: Periods of litters during the year
Months of the year on the X - axis
Number of monthly litters on the Y - axis
Vertically lined bars : our data
Horizontally lined bars : literature data
Blank bars : sum of all data

at their birth are perceptibly the same between males and females (Table 3).

Discussion and Conclusion.

The maximum number of 22 young vipers we obtained in captivity is weak with *Vipera russelli*, generally more prolofic (sometimes up to 63 young vipers) (Angel, 1950; Wall, 1921 quoted by Saint-Girons, 1972; Schmidt and Inger, 1960) but large vipers, such as *Bitis*, almost reach that number (59 with *Bitis gabonica*) or largely exceed it (80 with *Bitis arietans*), (Pitman, 1974). The average number of young vipers per litter seems related to the size of the species, but small vipers may well have large litters, as with *Vipera aspis* where the maximum recorded number of young vipers is 22 (Naulleau, 1975). These numbers of young vipers at birth are impressive, but death-rate is high, due to predators and above all, lack of food, as the young cannot easily find prey to suit their size. Moreover, sexual maturity for these vipers is late and reached after many years, which means that in spite of the number of vipers at birth, very few of them will reach reproductive age, and among certain species, females do not breed every year. As for *Vipera russelli*, we do not know the age of sexual maturity and the reproductive cycle in nature, but sexual maturity is very likely to occur later than when in captivity (2 years for both sexes). In the same way, the period between mating and breeding which lasts 125 days in laboratory, must be longer in natural conditions, as we have showed with *Vipera aspis*, (Naulleau, 1970, 1971, 1973 a and b). Sexual maturity is indeed more closely connected to growth than to age, and thus directly related to the conditions of captivity chosen to be as favourable as possible. The period between mating and breeding also has a lot to do with these conditions.

RESUME

La maturité sexuelle chez *Vipera russellii* est atteinte à l'âge de 2 ans dans les deux sexes. Les comportements sexuels sont comparables à ceux observés chez d'autres Vipéridés. Un seul des hémipénis participe à l'accouplement qui est de longue durée, jusqu'à 17 heures au moins. Les mises bas ont lieu préférentiellement en Juillet. La seule que nous ayons pu observer, de 11 vipéreaux et 8 oeufs non fécondés, a duré pendant 4 h 25 mn. Le nombre de vipéreaux par portée est de 15,4 et le nombre d'oeufs non fécondés de 5,4. Le sex-ratio est de 1,3 en faveur des femelles. La taille et le poids des vipéreaux à la naissance sont sensiblement les mêmes dans les deux sexes, respectivement 27,3 cm chez les mâles, 27 cm chez les femelles, 11,8 g chez les mâles et 11,9 chez les femelles.

SUMMARY

Sexual maturity of *Vipera russelli* is reached at the age of 2 yrs. for both sexes. Sexual behaviours can be compared to those of many other vipers. Only one hemipenis takes part in mating, which lasts a long time (up to 17 hours). Litters are more likely to occur in July. The only birth of a litter that we were able to observe lasted 4h 25, with 11 young vipers and 8 infertile eggs. We have recorded an average of 15.4 young vipers in a litter and 5.4 infertile eggs. Sex-ratio is 1.3 in favour of the females. The sizes and weights of newborn vipers are the same for both sexes, that is, 27.3 cm for the males, 27 cm for the females, 11.8 g for the males and 11.9 for the females.

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Table 1: Characteristics of vipers that have bred in laboratory.

Female		Male		Mating		Age	Length in cm		Weight in grs		Date of	Notes
N°	Birth-Date	N°	Birth-Date	Date	Duration		Male	Female	Male	Female	Parturition	
2	17/7/72	7	17/7/72	21/2/75	2h20	2 years and 7 months	115	101	845	608	5/7/76	
8	24/7/72	♂	17/7/72	21/1/76	17h	3 1/2 years	122.5	117.5	1098	1158		Accidentally died
4	17/7/72	7	17/7/72	21/2/78	8h30	5 years and 7 months	130	110	1069	835	26/6/78	
13	5/7/76	15	5/7/76	Not observed							28/9/78	

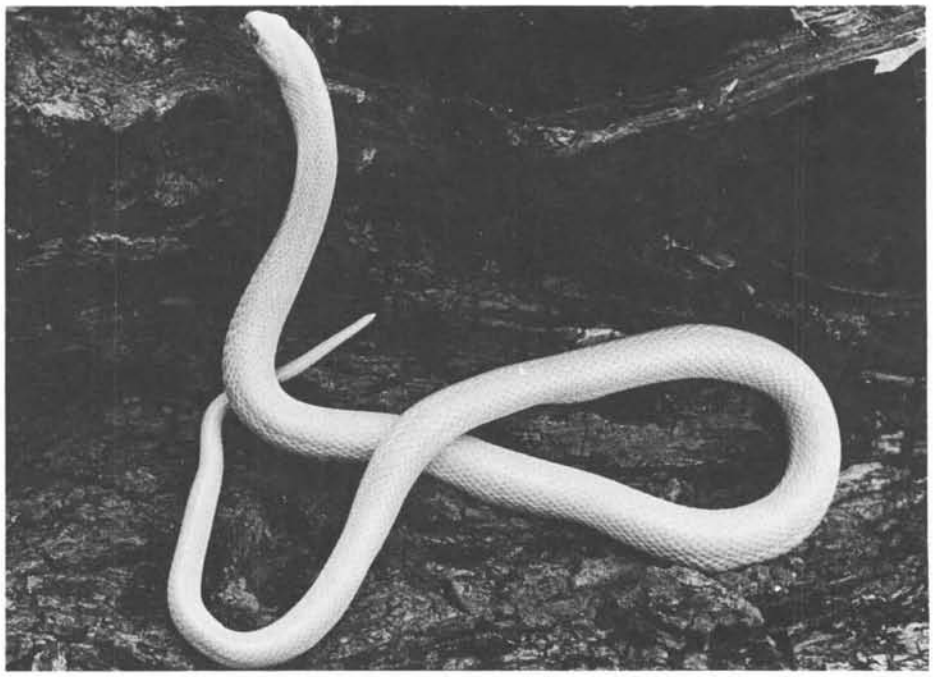
Table 2: General characteristics of 8 litters obtained in laboratory.

Parent's data				Litter data			
N° viper	Weight in grs of the viper after parturition	Length of the viper in cm	Age of the viper	Number of males in each litter	Number of females in each litter	Number of young vipers in each litter	Number of infertile eggs
I	728	117	unknown	3	6	9	7
II	695	123	unknown	minimum 6	minimum 8	20	4
III	811	125	unknown	minimum 8	minimum 8	22	9
IV	425	101	unknown	8	9	17	4
V	748	123	unknown	7	13	20	2
2	587	117.5	3 years 11 1/2 months	5	11	16	0
4	647	110	5 years 11 months	4	4	8	9
13	798	118	2 years 2 months 23 days	6	5	11	8

Table 3: Size and average weights of young vipers born in laboratory. The averages are indicated with their standard errors. Figures between brackets indicate the number of young vipers of each sex, by litter.

Female N°	Average length of males in cm	Average length of females in cm	Average weight of males in grs	Average weight of females in grs
I	28.67 ± 1.16 (3)	28.83 ± 0.47 (6)	13 ± 0.57 (3)	14.58 ± 0.48 (6)
II	27.92 ± 0.26 (6)	27.06 ± 0.19 (8)	13.17 ± 0.33 (6)	13.63 ± 0.15 (8)
III	26.75 ± 0.38 (8)	26.94 ± 0.45 (8)	10.75 ± 0.29 (8)	11.03 ± 0.36 (8)
IV	25.44 ± 0.33 (8)	25.25 ± 0.29 (9)	10.78 ± 0.28 (8)	11.25 ± 0.31 (9)
V	27.36 ± 0.84 (7)	27.38 ± 0.29 (13)	10.86 ± 0.32 (7)	10.96 ± 0.23 (13)
2	29.70 ± 0.37 (5)	29.85 ± 0.17 (11)	12.70 ± 0.49 (5)	13.32 ± 0.27 (11)
4	28.5 ± 0.61 (4)	29.75 ± 0.78 (4)	15.25 ± 0.63 (4)	16 ± 0.35 (4)
13	24.25 ± 0.76 (6)	21.30 ± 1.85 (5)	7.17 ± 0.83 (6)	5.60 ± 1.45 (5)
Average	27.32 ± 0.63	27.05 ± 0.99	11.71 ± 0.85	12.05 ± 1.12

G. NAULLEAU and B. van den BRULE
Centre d'Etudes Biologiques des Animaux Sauvages
Centre National de la Recherche Scientifique
Villiers-en-Bois - 79360 Beauvoir-s-Niort (France)



An albino *THAMNOPHIS RADIX HAYDENI* (Western Plains Garter Snake). USA. KANSAS: Sedgwick Co., 9.6 km N, 3.2 km W Clearwater on dirt road. 18 April 1978. T. L. Sullivan. In the collection of the Sedgwick County Zoological Society. Photograph by P. Gray and J. Marlett. Pentax with Tri-X at f 7.0 at 500th sec. Contributed by P. Gray.

NEWSNOTES

INTERNATIONAL STRATEGY FOR THE CONSERVATION OF EUROPEAN HERPETOFAUNA

With the increasing pressure on all species of European herpetofauna, the time for a concerted and unified European initiative by those most active in the field of herpetological conservation and field research has arrived.

The intention is to present, as soon as possible, a single succinct plan for the conservation of European herpetofauna, which incorporates the ideas, data, information, criticisms and suggestions put forward by active field herpetologists. The plan will then be presented to those European bodies capable of offering substantial funds.

Contributions are welcomed by all individual herpetologists regardless of their nationality or their affiliation to any society. We are not proposing a new society nor do we seek anything other than the rapid completion of a plan of action written and agreed by those individuals most involved with herpetology. In order to expedite this intent we propose that Mr. John Coborn, Cotswold Wild Life Park, Burford, Oxfordshire, England will act as co-ordinator, receiving plans or reports and disseminating these to other herpetologists for comment. ●

FUNDS AVAILABLE

The Forest Service, Caribbean Natural Forest (USDI) has reserved FY '81 funds to support ecological study of the Puerto Rican boa *(Epicrates inornatus)*. Funding will be at least sufficient to support a study of the boa in the National Forest (El Yunque), and may be sufficient to support an island-wide study. The Service hopes to fund a study in the first quarter of 1981, to be completed about a year later. Persons interested in more information, or wishing to submit proposals, should contact:

Mr. Jerry Bauer
P.O. Box K
Luquillo, P. R. 00673 ●

ERRATA

HR 11 (2): William F. Holmstrom's name was misspelled in Contents (Holstrum) and on p. 32 (Holstrom) (**HR** editor, blush here).

HR 11 (3): P. 80, *Pseudemys s. elegans* note; J. Harry Reynolds, Jr. — not Renolds. ●

SOCIETAS EUROPAEA HERPETOLOGICA

The SEH was founded by 24 herpetologists from eight European countries in fall, 1979. The aims of this new scientific society are to further scientific research, to participate in all problems regarding the conservation of amphibians and reptiles, and to encourage closer collaboration between all European and non-European herpetologists.

President: Josef Eiselt, Vienna, Austria; Vice-President: Jean Lescure, Paris, France; General Secretary: Marinus S. Hoogmoed, Leiden, Netherlands; Vice-Secretary: Alfredo Salvador, Leon, Spain; Treasurer: Heinz Wermuth, Ludwigsburg, West Germany; Vice-Treasurer: Franz Tiedemann, Vienna, Austria; First Co-Editor: Helmut Hemmer, Mainz, West Germany; Second Co-Editor: Alain Dubois, Paris, France.

The society's journal, **AMPHIBIA-REPTILIA,** will be devoted to scientific papers on all aspects of herpetology. This journal will now provide a medium of communication for herpetologists in Europe and elsewhere who previously had only the nationally organized and terrarium oriented journals and the three American based journals. Articles will be published in English, French, German or Spanish. Each issue will contain original papers, shorter articles, book reviews and news of the SEH. One volume will include four issues with approximately 90 pages each with a page size of 17 x 24 cm. Reproduction of illustrations will be of high quality.

Manuscripts will be reviewed by an editorial board comprised of 10 European herpetologists. Manuscripts may be submitted to either of the two co-editors:

Prof. Dr. Helmut Hemmer
Zoologisches Institut
Gutenberg Universitaet
Postfach 3980
D-6500 Mainz
West Germany

Dr. Alain Dubois
Laboratoire Reptiles/Amphibiens
Museum national d'Histoire Naturelle
25, Rue Cuvier
F-75005 Paris
France

Membership is open and worldwide to all interested persons and institutions. Active membership dues will be DM 70.00 (approximately $40.00) per year, which will include a subscription to the journal.

Send your name, address, nationality and membership dues to either Treasurer:

Dr. Franz Tiedemann
Naturhistorisches Museum
Postfach 417
A-1014 Wien
Austria

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Staatliches Museum fuer Naturkunde
Arsenalplatz 3
D-7140 Ludwigsburg
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Library subscriptions will cost DM 108.00 and may be ordered from:

Akademische Verlagsgesellschaft
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West Germany ●

HANDBUCH DER REPTILIEN UND AMPHIBIEN EUROPAS

The style of the Handbuch der Reptilien und Amphibien Europas is similar to the Catalogue of American Amphibians and Reptiles but the accounts are longer and more detailed. Each account will include a diagnosis and comparison, illustrations, systematic consideration, geographic distribution and map, ecology, development, behavior and literature bibliography.

The Handbuch will be published in five volumes:

1. Echsen I (Geckos, Agamen, Chamaeleons, Schleichen, Skinke und Eidechsen = Lacerten I)
2. Echsen II (Eidechsen II = Lacerten)
3. Schlangen und Schildkroeten
4. Schwanzlurche
5. Froschlurche

If ordered prior to publication, the first volume will cost DM 168.00. Following publication the price will be DM 216.00.

Information may be obtained from:
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Potsdamer Strasse 180/182
1000 Berlin 30
West Germany ●

HERP INVENTORY AVAILABLE

The "Inventory of Live Reptiles and Amphibians in North American Collections, Current January 1, 1980" is now available.

This inventory gives information on location and sex of all individual reptiles and amphibians of 912 species and 1,093 forms, held in 49 public and 33 private collections. There are also thirty-two pages of miscellaneous breeding information, including dates of egg laying and hatching, types of incubation media used, incubation temperatures, etc., as reported by the responding collectors. The complete report is 1-XVI + 156 pages.

The 1980 inventory is limited in numbers and will not be reprinted. Copies are now

available for $15.00 each, including packaging and postage, from:

Frank L. Slavens
P.O. Box 30744
Seattle, Washington 98103

Zoos and other institutions can be billed; all others please send money order or check with order.

HERPETOLOGICAL ART EXHIBIT

A herpetological art exhibit will be held during the 1981 joint annual SSAR/HL meeting at Memphis State University (9-14 August). If you wish to display, contact James S. Jacob, Local Committee Chairman, Ecological Research Center, Department of Biology, Memphis State University, Memphis, TN 38152. Telephone: (901) 454-2588 or 2581.

Necturus lewisi INFO NEEDED

The North Carolina State Museum of Natural History is conducting a life history and distribution study of *Necturus lewisi*. Funds for this study are provided by a cooperative agreement between the Office of Endangered Species, U. S. Fish and Wildlife Service, and the N. C. Wildlife Resources Commission, and by the N. C. Department of Agriculture. The primary purpose of the study is to acquire data sufficient to enable USFWS to assess the salamander's status with respect to the national list of endangered and threatened native fauna.

Any records of *N. lewisi*, supported by voucher specimens, could be helpful in establishing the salamander's present or past distribution. Contributions will be duly acknowledged in a future publication.

Please send information to Alvin L. Braswell, N. C. State Museum of Natural History, Box 27647, Raleigh, NC 27611. ●

HR NEEDS DRAWINGS

The supply of small line drawings **HR** uses for column breaks is depleted. Rather than keep showing you all the same ones over and over, I'd be grateful if artistically talented readers would contribute new stock. We cannot pay for material, but this is a good opportunity to place your work in a widely distributed publication. Please indicate if originals are to be returned. Format is unrestricted. Please do not send Xerox copies as they don't reproduce too well. Thanks!

GRP

ANOTHER *HERPERVERT. REV.*

If you would like to be immoralized, oops—immortalized, in yet another of these important satirical publications, contribute **now.** Cartoons, prose, poetry, phenograms, whatever are all welcome. Use of pseudonyms is suggested to subvert retribution. Please do not send **ideas** for the editor to expand upon. Said editor has enough ideas of his own and grows weary ghost writing. Photos whose content may be humorously twisted by caption or judicious surgery are especially welcome. The editor has never considered himself immune from parody, for those who've wondered. Appropriate themes for Tennessee are evolution, Appalachian snake handlers, etc.

ENDANGERED SPECIES PERMIT INFO.

SSAR members may avail themselves of the extensive permit information services of the Association of Systematics Collections at reduced cost (SSAR is a member society of ASC). Services cover state, federal and (to a certain extent) international permits and regulations. For more information, contact:

Thomas J. Berger
ASC
Museum of Natural History
University of Kansas
Lawrence, KS 66045
(913) 864-4867 ●

Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same.

These geographic distribution records have a **standard format,** and all authors should adhere to that format, as follows: SCIENTIFIC NAME, COMMON NAME (as it appears in **Standard Common and Current Scientific Names for North American Amphibians and Reptiles** , Collins, Huheey, Knight and Smith, 1978), LOCALITY, (use **metric** for distances), DATE (day, month, year), COLLECTOR(S), VERIFICATION BY, PLACE OF DEPOSITION AND CATALOG NUMBER (required), COMMENTS, CITATION(S), SUBMITTED BY (give name and address).

Some further comments. This geographic distribution does not publish "observation" records. Records submitted should be based on preserved specimens which have been placed in a university or museum collection (private collection depository records are discouraged).

Please submit new geographic distribution records in the **standard format** only to Joseph T. Collins, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. Short manuscripts are discouraged, and are only acceptable when data **cannot** be adequately presented in the standard format.

Recommended citation for new distribution records appearing in this section is: Jones, J. 1980. Geographic distribution: *Lampropeltis triangulum multistrata*. SSAR Herp. Review 10(1):1.

CAUDATA

AMBYSTOMA ANNULATUM (Ringed Salamander). USA: ARKANSAS. Baxter Co: .1 km W Midway. 29 September 1979. Johnny Hewett. Verified by S. E. Trauth. Auburn University Museum (AUM 29369). Boone Co: 12.8 km S Harrison. 1 April 1970. S. E. Trauth. (AUM 29370). These two new county records fill a distributional gap in the Ozark Plateau of Arkansas between Sharp County (McDaniel, V. R. 1975, SSAR Herp. Review 6:115) and Madison County (Anderson, J. D. 1965. Cat. Amer. Amph. Rept. 19.1).

Submitted by **STANLEY E. TRAUTH,** Department of Biology, Georgia Southwestern College, Americus, Georgia 31709. ●

AMBYSTOMA ANNULATUM (Ringed Salamander). USA: MISSOURI: Lincoln Co: Cuivre River State Park, 5 km E Troy. 18 September 1978. Bruce Schuette. Verified by Tom R. Johnson. St. Louis Museum of Science and Natural History (45-172). Record for county and northern range extension of at least 15 km from previous records in St. Charles and Warren counties (Johnson, 1977, The Amphibians of Missouri, Univ. of Kansas, Lawrence, 134 pp.).

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R. R. #1, Box 25, Troy, Missouri 63379. ●

AMBYSTOMA MACULATUM (Spotted Salamander). USA: MISSOURI: Lincoln Co: Cuivre River State Park, 5 km E Troy. 19 March 1979. Bruce Schuette. Verified by Tom R. Johnson. St. Louis Museum of Science and Natural History (79-22). Record for county and northern range extension of at least 15 km from previous records in St. Charles and Warren counties (Johnson, 1977, The Amphibians of Missouri, Univ. of Kansas, Lawrence, 134 pp.).

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R. R. #1, Box 25, Troy, Missouri 63379. ●

AMBYSTOMA OPACUM (Marbled Salamander). USA: MISSOURI: Lincoln Co: Cuivre River State Park, 5 km E Troy. 17 September 1978. Bruce Schuette. Verified by Tom R. Johnson. St. Louis Museum of Science and Natural History (45-167). First record in state from north of the Missouri River and a northern range extension of at least 40 km from previous records in St. Louis and Franklin counties (Johnson, 1977, The Amphibians of Missouri, Univ. of Kansas, Lawrence, 134 pp.)

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R.R. #1, Box 25, Troy, Missouri 63379. ●

HEMIDACTYLIUM SCUTATUM (Four-toed Salamander). USA: MISSOURI: Lincoln Co:

Cuivre River State Park, 5 km E Troy. 31 March 1979. Bruce Schuette. Verified by Tom R. Johnson and Ron Goellner. Officially listed as a RARE species in Missouri, this specimen was photographed and released (photograph deposited with the Natural History Section of the Mo. Dept. of Conservation). First record in state from north of the Missouri River and a northern range extension of at least 90 km from previous records in Crawford and St. Genevieve counties. The whole previous Missouri population was itself a disjunct population from their main range (Johnson, 1977, The Amphibians of Missouri, Univ. of Kansas, Lawrence, 134 pp.).

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R.R. #1, Box 25, Troy, Missouri 63379. ●

ANURA

RANA AREOLATA AREOLATA (Southern Crawfish Frog). USA: TEXAS: Kaufman Co: 3.2 km S of Prairieville. 6 September 1980. R. A. Baker. Dallas Museum of Natural History (DMNH 5103). Prairieville. 31 May 1980. R. A. Baker (DMNH 5104). Identified by W. Seifert. These specimens close the gap between the Red River and the Trinity River populations (Conant, 1975. A Field Guide to the Amphibians and Reptiles of Eastern and Central North America. Houghton Mifflin Co., Boston).

Submitted by **WAYNE SEIFERT,** Division of Lower Vertebrates, Dallas Museum of Natural History, P.O. Box 26193, Dallas, Texas 75226. ●

TESTUDINES

CHRYSEMYS SCRIPTA ELEGANS (Red-eared Slider). USA: NEW JERSEY: Mercer Co: Lake Carnegie in Princeton Township and Delaware-Raritan Canal in West Windsor Township adjacent to lake. Observed basking in lake by R. J. Stein and W. K. Eames on 20 April 1976. Four specimens collected from lake in basking traps on 2 June, 21 June, and 13 July 1977 and one hatchling collected from canal by dip netting on 16 June 1977 by R. J. Stein, W. K. Eames, and D. C. Parris. Verified by R. J. Stein. New Jersey State Museum (NJSM-P317, P318, P319, P320, P321). In addition to the five preserved specimens, more than one hundred observations have been made of this species basking in the lake, the canal, and the pond formed at the aqueduct of the Millstone River where it flows into Lake Carnegie. This first record of an established population in New Jersey undoubtedly originated as an introduction, as did numerous other populations (Conant, R. 1975. A Field Guide to the Amphibians and Reptiles of Eastern and Central North America, Houghton Mifflin Co., Boston). It is to be expected that this species will expand its range throughout central New Jersey following the Delaware-Raritan Canal and the Millstone River to the Raritan River drainage.

Submitted by **RAYMOND J. STEIN, WILLIAM K. EAMES, and DAVID C. PARRIS,** Bureau of Science, New Jersey State Museum, 205 W. State Street, Trenton, New Jersey 08625. ●

LACERTILIA

ANOLIS LIMIFRONS. Mexico: Quintana Roo: 0.5 km N Akumal. 1 March 1980. J. Parmerlee and S. Phillips. Direccion de la Fauna Silvestre, Mexico D.F. (field number 48). Coba. 4 March 1980. J. Parmerlee and R. Powell. Bobby Witcher Memorial Collection, Avila College (BWMC 01326). Verified by W. E. Duellman, University of Kansas Museum of Natural History. Previously only one coastal record from northern Quintana Roo (Lee, J. C., 1980. University of Kansas Museum of Natural History Miscellaneous Publication No. 67). These records indicate a continuous distribution south to the vicinity of Tulum.

Submitted by **R. POWELL and J. PARMERLEE,** Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

ANOLIS SAGREI (Cuban Brown Anole). USA: FLORIDA: Alachua Co: Gainesville, SW 2nd Ave., 100 m E of 13th St. 15 and 17 August 1980. J. R. Bain and M. L. Wygoda. Florida State Museum (UF 47681-47683). Verified by P. Meylan. Collected on sidewalk near dense hedge. Several hatchlings, juveniles, and adults noted. Apparently an isolated breeding population. Locality is approximately 62 km NE of the Gulf Hammock, Levy County record (Funk, R. 1979. SSAR Herp. Review 10(3):102.) and approximately 102 km WSW of the St. Augustine, St. Johns County record (Meylan, P. 1977. SSAR Herp. Review 8(2):29.). This is the first inland report of *A. sagrei* from northern Florida.

Submitted by **MARK L. WYGODA,** Department of Zoology, University of Florida, Gainesville, Florida 32611 and **JAMES R. BAIN,** Department of Natural Sciences, Florida State Museum, Gainesville, Florida 32611. ●

EUMECES ANTHRACINUS PLUVIALIS (Southern Coal Skink). USA: ARKANSAS: Bradley Co: 18 km W of Monticello on AR 4, T13S, R9W, Sec. 1. 18 March 1979. J. D. Walls. Verified by V. R. McDaniel. Arkansas State University Herpetol. Mus. (ASUHM 3922). First record for the county and narrows the gap between central Arkansas and extreme southcentral Arkansas populations (Dellinger, S. C., and J. D. Black. 1938. Occ. Pap. U. Arkansas Mus. (1):1-47; Dowling, H. G. 1957. Occ. Pap. U. Ark. Mus. 3:1-51; Conant, R. 1975. A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston).

Submitted by **CHRIS T. MCALLISTER,** Department of Biological Sciences, North Texas State University, Denton, Texas 76203. ●

SCELOPORUS UNDULATUS ELONGATUS (Northern Plateau Lizard). USA: WYOMING: Carbon Co: 1.6 km S, 4.0 km E Overland Crossing, North Platte River, T18N R85W SW¼ Sec. 1, 2042 m. 1 August 1980. G. Hammerson and B. Lapin. Identified by G. Hammerson, verified by H. M. Smith. Univ. Colorado Mus., Boulder, UCM 52679-52692. First record outside Colorado River drainage area; collection site is east of the Continental Divide. *Sceloporus u. erythrocheilus* inhabits the N. Platte R. drainage area in the Laramie Mountains to the east and northeast (Maslin, 1956, Herpetologica 12:292). The status of *S. undulatus* in the apparent hiatus between *S. u. elongatus* and *S. u. erythrocheilus* in southern Wyoming needs clarification.

Submitted by **GEOFFREY A. HAMMERSON,** Department of Environmental, Population & Organismic Biology, University of Colorado, Boulder, Colorado 80309, and **BETH P. LAPIN,** Colorado Natural Heritage Inventory, 1726 Champa, Suite 307, Denver, Colorado 80202. ●

SCINCELLA LATERALIS (Ground Skink). USA: MISSOURI: Lincoln Co: Cuivre River State Park, 5 km E Troy. 5 April 1978. Bruce Schuette. Verified by Tom R. Johnson. St. Louis Museum of Science and Natural History (46-299). First record in state from north of the Missouri River and a northwestern range extension of 53 km from previous record in St. Louis County (Anderson, 1965, The Reptiles of Missouri, Univ. of Missouri Press, Columbia, 330 pp.).

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R.R. #1, Box 25, Troy, Missouri 63379. ●

SCINCELLA LATERALIS (Ground Skink). USA: MISSOURI: Monroe Co: Mark Twain State Park, 2 km S Florida. 28 June 1978. Bruce Schuette. Verified by Tom R. Johnson. St. Louis Museum of Science and Natural History (46-302). Record for county and northwestern range extension of 90 km from Lincoln County (135 km from previous record in St. Louis County) (Anderson, 1965, The Reptiles of Missouri, Univ. of Missouri Press, Columbia, 330 pp.).

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R.R. #1, Box 25, Troy, Missouri 63379. ●

SPHAERODACTYLUS GLAUCUS (Dwarf gecko). Mexico: Quintana Roo: 10 km N Playa del Carmen. 29 February 1980. H. Gregory and R. Powell. Bobby Witcher Memorial Collection, Avila College (BWMC 01332). Verified by R. Powell. Only previous record from northern Quintana Roo is from Puerto Juarez (Lee, J. C., 1980. University of Kansas Museum of Natural History Miscellaneous Publication No. 67). This record extends

known distribution southward some 50 km and suggests the previously described locality is not an isolated population.

Submitted by **J. PARMERLEE and R. POWELL,** Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

SERPENTES

CARPHOPHIS AMOENUS VERMIS (Western Worm Snake). USA: ILLINOIS: McDonough Co: About 21 km SW Macomb and 3.2 km NNW Colmar (Sec. 31, T5N, R4W). 17 April 1971. G. R. Thurow. Verified by H. Marx, Field Museum of Natural History. Western Illinois University Collection (WIU 513). This and other specimens seen up to 1977, when this disjunct colony probably became extinct due to xerification associated with increased cattle grazing. One duplicate county specimen collected in 1980 from near Fandon (Sec. 32, T5N, R3W) and released. First record for county, and extends range about 45 km E from earlier western state border records.

Submitted by **G. R. THUROW,** Department of Biological Sciences, Western Illinois University, Macomb, Illinois 61455. ●

CEMOPHORA COCCINEA COPEI (Northern Scarlet Snake) USA: TEXAS: Henderson Co: 4 km E of highway junction 274 & 85 on 85. 4 July 1979. R. Moore. Identified by W. Seifert. Dallas Museum of Natural History (DMNH 5105). Extends the range one county westward (Raun and Gehlbach, 1972, Amphibians and Reptiles in Texas, DMNH Bulletin 2).

Submitted by **WAYNE SEIFERT,** Division of Lower Vertebrates, Dallas Museum of Natural History, P.O. Box 26193, Dallas, Texas 75226. ●

CONOPHIS LINEATUS (Mexican rear-fanged snake). Mexico: Quintana Roo: 14 km N Akumal. 5 March 1980. M. Henderson and R. Powell. Bobby Witcher Memorial Collection, Avila College (BWMC 01335). Verified by R. Powell. Second known locality from Quintana Roo, extends known distribution southward some 70 km (Lee, J. C., 1980. University of Kansas Museums of Natural History Miscellaneous Publication No. 67).

Submitted by **R. POWELL and J. PARMERLEE,** Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

CROTALUS DURISSUS (Tropical rattlesnake). Mexico: Quintana Roo: 20 km N Playa del Carmen. R. Powell and J. Parmerlee. Bobby Witcher Memorial Collection, Avila College (BWMC 01336). Verified by R. Powell. First record from northern Quintana Roo (Lee, J. C., 1980. University of Kansas Museum of Natural History Miscellaneous Publication No. 67). Lee (1980) indicates a complementary distribution of *C. durissus* and *Bothrops asper* in the northern part of the Yucatan Peninsula. He suggests competitive exclusion. This record would negate that hypothesis.

Submitted by **R. POWELL and J. PARMERLEE,** Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

ELAPHE TRIASPIS (Green ratsnake). Mexico: Quintana Roo: 5 km N Akumal. 1 March 1980. H. Gregory and N. Laposha. Bobby Witcher Memorial Collection, Avila College (BWMC 01342). Verified by R. Powell. This is the third known locality from Quintana Roo and the only coastal record (Lee, J. C., 1980. University of Kansas Museum of Natural History Miscellaneous Publication No. 67). Extends known distribution about 80 km SE and NE from previous sites.

Submitted by **J. PARMERLEE and R. POWELL,** Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

OXYBELIS AENEUS (Mexican vine snake). Mexico: Quintana Roo: 10 km N Playa del Carmen. R. Powell. Bobby Witcher Memorial Collection, Avila College (BWMC 01345). Verified by R. Powell. This is the first record reported from the east coast of Quintana Roo (Lee, J. C., 1980. University of Kansas Museum of Natural History Miscellaneous Publication No. 67). Extends known distribution approximately 50 km to the east.

Submitted by **R. POWELL and J. PARMERLEE,** Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

STORERIA O. OCCIPITOMACULATA (Northern Redbelly Snake) USA: INDIANA: Lake Co: Griffith, Hoosier Prairie, 136 meters S. Main St., 0.4 km E of intersection with Kennedy Avenue. 24 June 1979. A. Resetar and D. Roti Roti. Verified by Alan Resetar. Field Museum of Natural History (FMNH 211854). This is the first record, documented by a specimen, of the occurrence of *Storeria o. occipitomaculata* in the northern half of Indiana. This species occurs in adjacent Will and Cook counties in Illinois (Smith, P. W. 1961. The Amphibians and Reptiles of Illinois. Illinois Nat. Hist. Survey, Vol. 28, Art. 1) Minton (1972, Amphibians and Reptiles of Indiana, Indiana Acad. of Sci., Monog. No. 3) mentioned a record from Gary, but regarded it as questionable. Griffith is within a few miles of the Gary city limits. This specimen was collected in a tall grass prairie. Subsequent specimens collected in Munster (Lake County, Indiana) were collected in an old field habitat.

Submitted by **ALAN RESETAR,** Division of Amphibians and Reptiles, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605. ●

VIRGINIA VALERIAE ELEGANS (Western Earth Snake). USA: MISSOURI: Lincoln Co: Cuivre River State Park, 5 km E Troy. 6 April 1978. Bruce Schuette. Verified by Tom R. Johnson. St. Louis Museum of Science and Natural History (46-298). Second record from northern Missouri, but the first from NE part of state. Record for county and range extension of 53 km north from previous record in St. Louis County, 190 km east from Saline County record and 270 km southeast from Grundy County record (Anderson, 1975, The Reptiles of Missouri, Univ. of Missouri Press, Columbia, 330 pp.).

Submitted by **BRUCE SCHUETTE,** Missouri Department of Natural Resources, Cuivre River State Park, R.R. #1, Box 25, Troy, Missouri 63379. ●

DISTRIBUTIONAL RECORDS FOR JOHNSON COUNTY, TEXAS

The recent review of the distribution of amphibians and reptiles in Texas by Raun and Gehlbach (1972), and subsequent reports (cited by Karges, 1978) indicate a paucity of records for Johnson County, Texas. The following new county records and range extensions were collected by the author (unless otherwise noted) and are deposited in the Collection of Vertebrates, The University of Texas at Arlington (UTACV). All identifications were made by the author and verified by Bern W. Tryon and David B. Heckard.

ANURA

BUFO SPECIOSUS (Texas Toad). 7.0 km N Godley on FM rd. 2435. 7 May 1979. G. Carl and S. Myers. A-7120. Extends range margin eastward from Hood Co.

BUFO VALLICEPS (Gulf Coast Toad). 11.0 km W Cleburne on U.S. 67. 6 May 1979. A-7101.

GASTROPHRYNE OLIVACEA (Great Plains Narrowmouth Toad). 15.4 km W Rio Vista on FM rd. 916. 30 April 1979. A-7098.

HYLA CHRYSOSCELIS/VERSICOLOR (Gray Treefrog). 15.4 km W Rio Vista on FM rd. 916. 30 April 1979. A-7097.

PSEUDACRIS CLARKI (Spotted Chorus Frog). 8.8 km W Rio Vista on FM rd. 916. 30 April 1979. A-7099. 1.6 km NW Godley on Texas 171. 1 May 1979. A-7100.

TESTUDINES

CHRYSEMYS CONCINNA TEXANA (Texas River Cooter). 0.2 km N of county rd. 1108 on Mill Ck. 13 May 1979. G. Carl and R. Stevens. R-8737. Partially bridges the gap between Tarrant and McLennan Counties.

TRIONYX SPINIFERUS PALLIDUS (Pallid Spiny Softshell). 0.2 km N U.S. 67 on FM rd. 2331. 13 May 1979. G. Carl and R. Stevens. Private collection of R. Stevens; will be donated to UTACV.

SERPENTES

CROTALUS ATROX (Western Diamondback Rattlesnake). 2.2 km W Ham Creek Park on County rd. 1108. 6 May 1979. R-8700. Bridges the gap along the eastern range margin between Tarrant and Hill Counties.

ELAPHE OBSOLETA LINDHEIMERI (Texas Rat Snake). 12.2 km N Godley on FM rd. 2435. 1 May 1979. R-8698.

LAMPROPELTIS CALLIGASTER CALLIGASTER (Prairie Kingsnake). 7.5 km N Godley on FM rd. 2435. 25 April 1979. R-8707. Fills a gap in distribution along the western edge of the range between Tarrant and Bosque Counties.

LAMPROPELTIS GETULUS HOLBROOKI X SPLENDIDA (Speckled X Desert Kingsnake). 2.6 km N Godley on FM rd. 2435. 6 May 1979. G. Carl and S. Myers. R-8702. 3.8 km N Godley on FM rd. 2435. 7 May 1979. R-8706.

NERODIA ERYTHROGASTER TRANSVERSA (Blotched Water Snake). 10.2 km W Cleburne on U.S. 67. 6 May 1979. R-8705.

NERODIA RHOMBIFERA RHOMBIFERA (Diamondback Water Snake). 16.2 km S Godley on FM rd. 2331. 6 May 1979. R-8704.

OPHEODRYS AESTIVUS (Rough Green Snake). At Mill Ck. 4.6 km W of Ham Creek Park on county rd. 1108. 6 May 1979. R-8701.

PITUOPHIS MELANOLEUCUS SAYI (Bullsnake). 0.8 km S Godley on FM rd. 2331. 6 May 1979. R-8703.

SALVADORA GRAHAMIAE LINEATA (Texas Patchnose Snake). 9.0 km S Cleburne State Park on FM rd. 1434. 6 May 1979. R. 8699. Extends range margin eastward from Somervell Co.

I thank John P. Karges for his assistance.

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OCCURRENCE OF *PELAMIS PLATURUS* (LINNAEUS) IN EL SALVADOR

Previous records of *Pelamis platurus* in the Pacific marine waters of Central America included Panama, Costa Rica, Nicaragua and Guatemala (Kropach, 1975) and Honduras (Wilson, McCranie, and Porras, 1978; Cruz, Wilson, and Espinosa, 1979), but no definite locality records were known from El Salvador, although its occurrence had been expected there (Hoge and Romano, 1971).

Four specimens of *Pelamis platurus* are now available from Salvadoran marine waters. The locality records for these are: Playa de San Diego, Departamento de la Libertad, 13° 28'N,89° 14'W (HH 418 ♀, 595 ♀); Playa de San Blas, Departamento de La Libertad, 13° 29' 05"N,89° 23'W (MHNES 30-573 ♂); Playa El Pimental, Departamento La Paz, 13° 23'N, 89° 06'W (MHNES 30-574 ♀). All specimens were found washed up on the beach.

The Salvadoran specimens have the following characteristics: supralabials 8 to 9; infralabials 10 to 13; preoculars 1-1; postoculars 2-2(3), 2-1(1); anterior temporals 2-2(2), 2-3, ?-3; posterior temporals 4-3, 2-2, 3-3, ?-4; ventrals 287 in single male and 316-342 (mean, 329.3) in three females; anal plate divided; total length 234, 250, 560, 605 mm; tail length 31, 59(2), 60 mm. Color in life was as follows: bicolored, black dorsally, yellow ventrolaterally; black coloration on tail forming a sawedged pattern; some black spots ventrolaterally over a yellow background.

The Salvadoran localities are approximately 162 km W from those recorded by Wilson, McCranie and Porras (1978) and Cruz, Wilson and Espinosa (1979) in the Golfo de Fonseca in Honduras.

The distribution of *Pelamis platurus* in the eastern Pacific, as presently known, ranges from the Gulf of California to Ecuador (Kropach, 1975), including El Salvador and Honduras.

ACKNOWLEDGEMENTS

I thank the authorities at the Museo de Historia Natural de El Salvador (MHNES) for allowing me to examine material in their collections and Sres. Guillermo Linares and José A. Chávez for presenting me with a specimen. I also thank Sra. Estela de Gómez for typing the manuscript. HH refers to my private collection in El Salvador.

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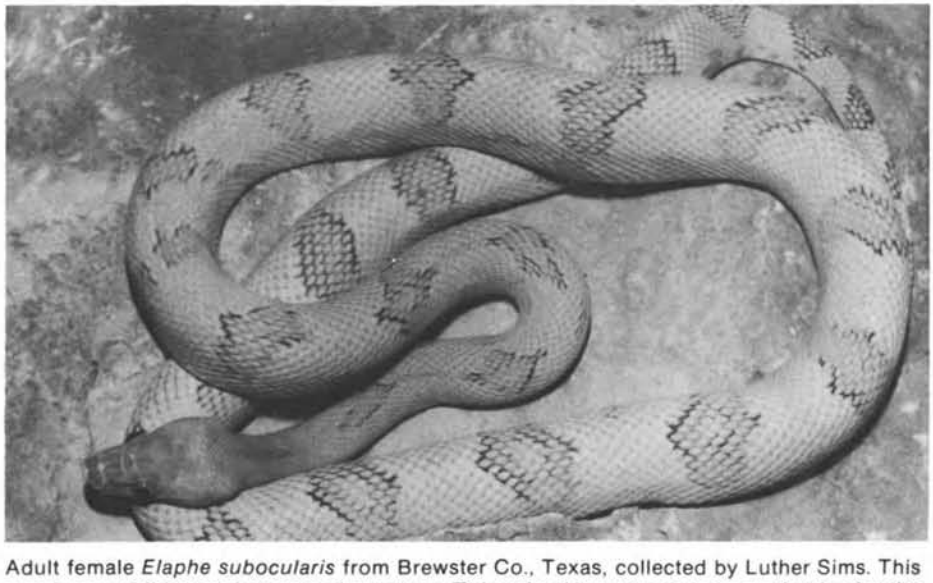
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Adult female *Elaphe subocularis* from Brewster Co., Texas, collected by Luther Sims. This specimen exhibits an aberrant color pattern. This animal is currently being maintained at the Dallas Zoo. Photo by W. E. Lamoreaux.

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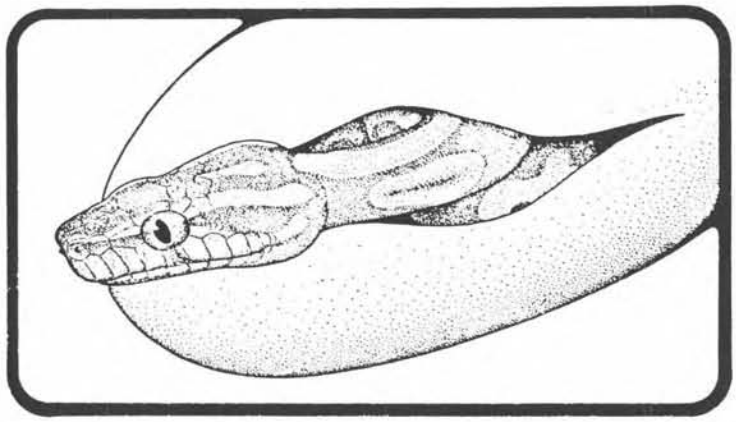
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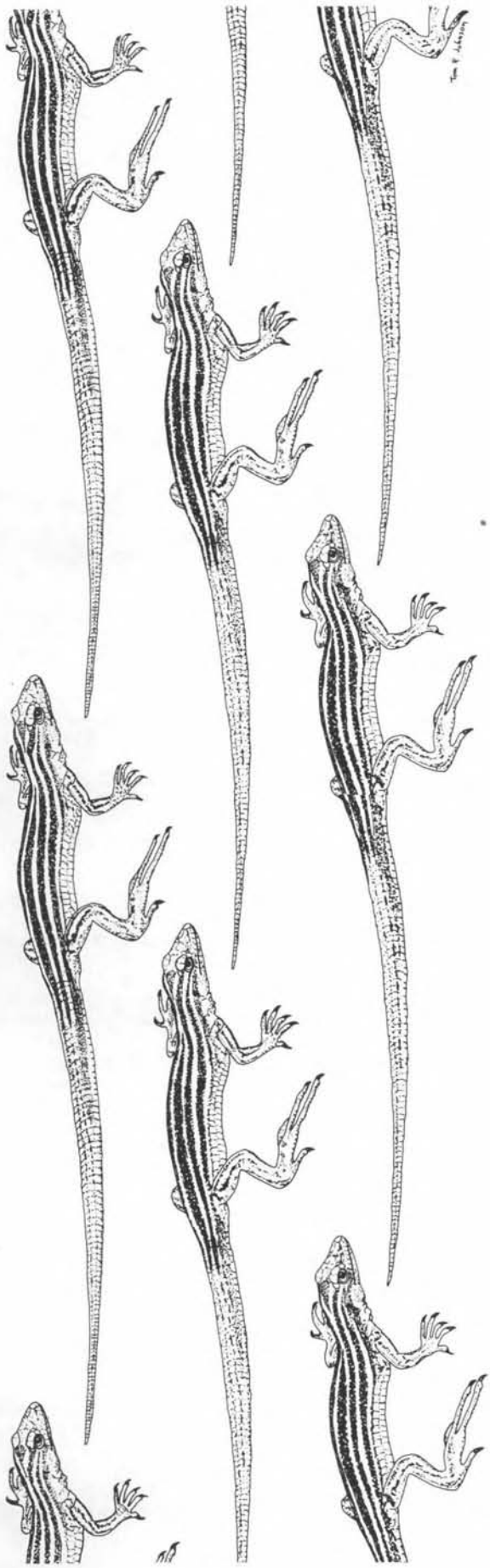
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Volume 11 September 1980 Number 3

Contents

SSAR BUSINESS

Proceedings of the 1980 SSAR Business Meeting 66
1980 Recipients of SSAR Grants-in-Herpetology 67
Carter wins 1980 SSAR Kennedy Award 67
Abstracts of papers: SSAR/HL Annual Meeting 67

FEATURE ARTICLES

Money for research in federal endangered species program, by C. Dodd 70
Herpetology at the Savannah River Ecology Laboratory, by W. Gibbons and J. Caldwell 72
There is no evidence that *Bipes* occurs in the U.S., by C. Gans and T. Pappenfuss 74
A comment on J. Howard Campbell's *Bipes* report, by H. Dundee 74

LEGISLATIVE ALERT

Responses needed 76

CURATION OF COLLECTIONS 76

TECHNIQUES

An effective method of preserving large reptiles, by J. A. Johnston and B. J. Parker 77

HERPETOLOGICAL HUSBANDRY

Captive reproduction in Sonoran black kingsnakes (*Lampropeltis getulus nigritus*), by K. Neitman 78

NEWSNOTES 79

GEOGRAPHIC DISTRIBUTION

New records 80
Distribution and status of *Varanus salvator* in India and Sri Lanka, by R. and Z. Whitaker 81

REGIONAL SOCIETY NEWS

St. Louis Herpetological Society 83
ESHL Meeting 83

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SSAR BUSINESS

PROCEEDINGS OF THE 1980 SSAR GENERAL BUSINESS MEETING IN MILWAUKEE

The annual general business meeting of the SSAR was called to order by President Robert G. Webb at 3:20 PM on 8 August 1980 in the Wisconsin Room East of the Student Union at the University of Wisconsin at Milwaukee.

President Webb made the following announcements: 1) The SSAR Board appointed Herbert Dessauer, LSU Medical Center, to replace Roger Conant on the SSAR Board of Directors for the remainder of Conant's term of office (until 31 December 1981); 2) The new SSAR *Contributions to Herpetology* series has been successfully launched, with initial sales of the first number in this series having recovered nearly two-thirds of the capital outlay; 3) Stephen G. Tilley will become editor-in-chief of the SSAR's *Catalogue of American Amphibians and Reptiles* effective 1 January 1981, and the SSAR will continue, during 1981, to issue 25 accounts of the CAAR without a price increase; 4) Authors of major papers (not notes) published in the *Journal of Herpetology*, if they wish separates, will be required to order and purchase 300 separates; 5) Individuals publishing in the *Journal* are strongly encouraged to deposit voucher specimens in university or museum collections to document their research; 6) The 1982 Silver Anniversary Meeting of the SSAR will probably be held in Raleigh, North Carolina, providing the Annual Meeting Site Committee successfully concludes current negotiations; 7) The winner of the 1980 Kennedy Award of $100 was announced (see *Herp Review*); 8) The recipients of the 1980 SSAR Grants-In-Herpetology were announced (see *Herp Review*); 9) The SSAR has expressed interest in an initial proposal to co-sponsor, with the Cornell University Laboratory of Ornithology, a new edition of the popular record "Voices in the Night," and the SSAR Board will consider such a proposal in detail in the near future; 10) and, The SSAR Board expressed interest in publishing the Crocodilian symposium held at this meeting provided that a mechanism for implementation can be found and provided that reviews indicate that such a book would be a substantial contribution to herpetology.

President Webb called on Joseph Collins, chairperson of the Nominating Committee, to present his committee's slate of nominees for 1981 office, as follows:

For President-elect:	Kraig Adler
	Ronald Brandon
For Secretary:	Joseph T. Collins
For Treasurer:	Henri Seibert
For Board of Directors:	Max A. Nickerson
	Stephan Tilley
	Marvalee Wake
	Richard Wassersug

There being no nominations from the floor, James Knight moved and Joseph Collins seconded to accept the recommendations of the Nominating Committee. The motion passed unanimously.

President Webb pointed out that a critical financial situation existed within the SSAR, and announced that the SSAR Board of Directors had established the following dues and subscription schedule for 1981: Students, $15.00; Sustaining, $25.00; Contributing, $30.00; and Institutional Subscription, $30.00. In addition, President Webb stated that the SSAR Board had instituted a $3.00 inflationary surcharge on regular dues, raising them from $15.00 to $18.00. He asked for and received a unanimous vote of commitment from the assembled SSAR members to institute this surcharge for 1981 only.

SSAR treasurer Henri C. Seibert announced that the SSAR Board had approved a budget of $66,475 for fiscal 1981, and stated that the SSAR membership continued to grow.

President Webb then yielded the floor to the Resolutions Committee composed of Frances J. Irish, Robert A. Thomas, Thomas H. Fritts and Ronn Altig.

1) Frances J. Irish presented the following resolution:

Whereas, the 1980 annual meeting was convened at the University of Wisconsin at Milwaukee and co-hosted by the Milwaukee Public Museum from 6 to 10 August, and;

Whereas, the elegance of the City of Milwaukee has served to attract a gathering of distinguished herpetological scholars, and;

Whereas, the hospitality of all concerned has been quite generous, and;

Whereas, the meetings have been efficiently orchestrated and the accomodations have been superior, and;

Whereas, the assembled membership has benefited greatly from the symposia offered, and enjoyed the opportunity to interact with the many participating foreign scientists, therefore be it

Resolved, that the membership extends its appreciation to the local committee and its assistants, consisting of Max A. Nickerson, Albert A. Williams, Sherman Ketcham, Mary Binder, Robert W. Henderson, Drew Hildebrandt, Dan Janik, John Minnick, Maria Plonczynski, Jeff Riedi, Rich Sajdak, Lee Tischler, Ed Cukjuti, Adrian Czajka, Pat Alexander, Garard Thielke, Vali Kiaie, Liz Tylendra, Alan Ragnlie, Kevin Hanley, Phil Whitford, Gary Beyer, Dave Grambow, Ann Bernier, Margie Mullet, Earl Olfe, Paul Miller, Cynthia Vernon, Roger Opey, Mary Ann Opey, Dave Sorensen, Marje Ketcham, Cliff Van Beek, Fred Prohaska, Joan McDonald, Nathan Kraucunas, Patrice Lastufka, Keith Chipman, Mark Tohalka, Stan Hopkins, and Jessica Johnson, and to the chairpersons of the three SSAR symposia, Bern W. Tryon, John C. Murphy and Rich Seigel, and to the Wisconsin Herpetological Society.

The resolution was adopted unanimously.

2) Robert Thomas (better known as the Urban Cowboy) delivered the following resolution (as a minority report):

Whereas, the 1980 annual meeting was held at the University of Wisconsin at Milwaukee and co-hosted by the Milwaukee Public Museum from 6 to 10 August, and;

Whereas, the beer breweries and parlors of the city of Milwaukee have served to attract a gathering of relatively extinguished herpervertologists (with the exception of three unnamed souls), and;

Whereas, the meeting has been efficiently orchestrated and the accomodations were superior (except for the hot water, cold water, no water, no air-conditioning, and the absence of selected shower curtains), and;

Whereas, John Wright has once again failed to attend a major herpetological meeting, and;

Whereas, Dick Vogt *did* somehow manage to wander into Milwaukee (herding his flock of sheep, as it were), and;

Whereas, Roy McDiarmid lost a Uher tape recorder over a wager concerning 600 or so country-music-loving nuns in Texas, therefore be it

Resolved, that in the future the Resolution Committee *not* be pressed into service on such short notice before the General Business Meeting, and that Jim Jacobs, local chairperson for next year's meeting, be instructed to present to next year's assembled membership a list of honky-tonk (and rock 'n' roll boogie) dance halls.

A few weak yeas carried the above resolution, the silent majority of members having been too stunned to react.

3) Kraig Adler presented the following resolution:

Whereas, Stephen R. Edwards has faithfully served as the SSAR secretary for many years, and;

Whereas, under press of other responsibilities he felt it necessary to resign this position in March 1980, and;

Whereas, the SSAR owes Steve a great debt of gratitude for his service to the SSAR, therefore be it

Resolved, that the SSAR officers, Board of Directors and assembled membership extend to Steve its warmest thanks for his service to the SSAR.

The resolution was adopted unanimously.

4) Joseph T. Collins offered the following resolution:

Whereas, Richard G. Zweifel has diligently served as editor-in-chief of the SSAR Catalogue of American Amphibians and reptiles, and;

Whereas, he has set and maintained the highest of standards and quality in the production of the catalogue, and;

Whereas, after years of service to the SSAR, Richard has resigned as editor-in-chief effective the end of 1980, and;

Whereas, he will continue to serve herpetology as section editor for the Anura, therefore be it

Resolved, that the SSAR and its members extend to Richard Zweifel its heartfelt thanks and gratitude for a job done with excellence and high quality.

The resolution was adopted unanimously.

President Webb then introduced Jim Jacobs, local committee chairperson for the 1981 meeting at Memphis. Jim presented a slide show and talk extolling the virtues of Memphis, and promised the assembled SSAR membership that a list of good dance halls would be ready upon our arrival next August.

The SSAR General Business meeting adjourned at 4:50 PM.

Respectfully submitted,

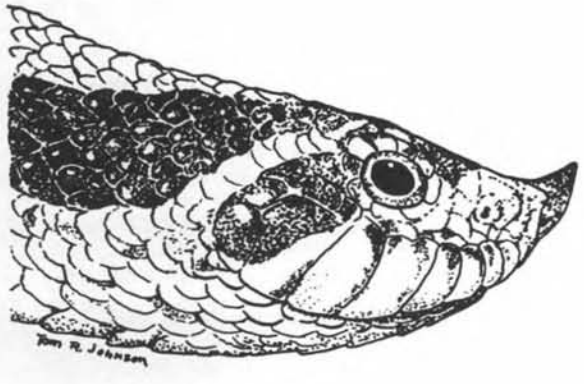
JOSEPH T. COLLINS
SSAR Secretary ●

1980 RECIPIENTS OF SSAR GRANTS-IN-HERPETOLOGY

The SSAR Committee on Grants-In-Herpetology, at the SSAR annual meeting in Milwaukee during August 1980, announced the recipients of SSAR grants for 1980. Awards were made in three of the four categories for these grants (no zoo research proposals were received in 1980). The categories to which grants were made were: Conservation, Graduate Student Research, and Regional Herpetological Society proposals. The recipients were:

Conservation: ($300.00)	
Richard Seigel	$225.00
Michael W. Klemons	75.00
Graduate Student: ($300.00)	
Richard B. King	175.00
Jonathan A. Campbell	75.00
Joseph C. Mitchell	25.00
Lawrence L. Woolbright	25.00
Regional Herpetological Society ($300.00)	
Kansas Herpetological Society	200.00
Wisconsin Herpetological Society	100.00

The Society extends its congratulations to the recipients, and encourages interested individuals and organizations to submit their proposals now for the 1981 awards to: Martin J. Rosenberg, Department of Biology, Case Western Reserve University, Cleveland, Ohio 44106. ●



CARTER WINS 1980 SSAR KENNEDY AWARD

The 1980 Kennedy Award Committee has determined that the paper "Structure and Function of the Subcutaneous Lymph Sacs in the Anura (Amphibia)," authored by David B. Carter, was the best student paper published in Volume 13 (1979) of the *Journal of Herpetology*. For his efforts the author was recognized and awarded a $100 check at the SSAR business meeting in Milwaukee, WI, 8 August 1980.

I gratefully acknowledge the members of the 1980 Committee consisting of Robin Andrews, Bill Brown, Alan Channing, and John Iverson for their service.

Michael V. Plummer, Chairman
Kennedy Award Committee ●

ABSTRACTS OF PAPERS SSAR/HL 1980 ANNUAL MEETING

ACHAVAL, Federico and Melita Meneghel. Ecology of *Caiman latirostris latirostris*.

ALDRIDGE, Robert D. Effect of hypophysectomy and mammalian follicle stimulating hormone (FSH) on female *Nerodia taxispilota*.

ALFORD, Ross A. Habitat partitioning in anuran larvae.

NO AUTHOR GIVEN. Comparative energetics of *Sceloporus* and *Cnemidophorus lizards*.

BAGSHAW, Clarence and I. Lehr Brisbin, Jr. Long-term declines in radionuclide contamination levels of two species of snakes inhabiting a nuclear reactor effluent stream and swamp ecosystem.

BAILEY, Joseph R. Snakes and their significance to Australian biogeography.

BANCROFT, G. Thomas and J. Steve Godley. Diel and seasonal activity patterns of amphibians and reptiles in a central Florida lake.

BERRY, James F. and Patricia Westerfield. Underwater oxygen consumption in kinosternid turtles.

BRAZAITIS, Peter and Myrna E. Watanabe. The doppler, a new tool for herpetological blood studies.

BREDEN, Felix and Carol Kelly. The effect of social interactions on the variance in metamorphic weight and time to metamorphosis of *Bufo americanus* larvae.

BRIGGS, Jeffrey L. The green frog populations of eastern Saudi Arabia.

BRISBIN, I. L. Jr. Genetic patterns and strategies for the management and maintenance of genetic variability in wild and captive populations of crocodilians.

BROOKS, Garnett R. Territorial combat in *Anolis lividus*.

BROWN, Lauren E. The case of the Houston toad.

BROWN, William S. and William S. Parker. Growth, reproduction and demography of the racer, *Coluber constrictor mormon*, in northern Utah.

NO AUTHOR GIVEN. An ecological study of the cricket frog, *Acris crepitans*.

CAMPBELL C. A., and D. W. Perrin. The queen snake, *Regina septemvittata* (Say) Baird and Girard 1853, In Canada.

CARPENTER, Charles C. Dominance in snakes.

COLLINS, Joseph T. Animal pollution.

CRAWFORD, Kenneth M. Operative environmental temperatures of basking turtles, *Chrysemys scripta*.

DAVENPORT, Michael L., and Eliza S. Soyster. Behavioral observations on a captive group of Cuban crocodiles, *Crocodylus rhombifer*.

DAVIC, Robert D. and Steven R. Kleeberger. Winter and spring feeding habitats of *Desmognathus f. fuscus* and *Eurycea b. bislineata* salamander larvae in northeastern Ohio.

DAVIS, J. E., J. R. Spotila and W. C. Schefler. Evaporative water loss from the skin and respiratory tract of alligators, *Alligator mississippiensis*.

DRONEY, David. Competition and coexistence of three species of plethodontid salamanders.

DUGAN, Beverly A. Interactions between nesting crocodiles and iguanas.

EMERSON, Sharon B. Frog postcranial morphology: identification of a functional complex.

ESTOL, Carlos O. Scale microdermatoglyphics of members of the viperid genus *Trimeresurus*.

FEDER, Martin E. Environmental variability and thermal acclimation of metabolism in anurans.

FELDMAN, Mark L. Effects of rotation on the viability of turtle eggs.

FELDMAN, Mark L. A method to evoke egg laying in turtles.

FERGUSON, Mark W. J. The structure, chemical composition, and disposition of the egg shell, embryonic membranes and egg caruncle *in Alligator mississippiensis*.

FERGUSON, Mark W. J. Crocodilian embryology: an overview.

FITCH, Henry S. Survey of sexual size differences in reptiles.

FORD, Neil B. Body shape and size in relation to clutch size in garter snakes.

FORESTER, Don C. and Richard Zanetti. The effect of prolactin on the geotactic behavior of the red-spotted newt (*Notophthalmus viridescens*).

FORESTER, Don C. Brooding behavior in the mountain dusky salamander: does the female's presence reduce clutch desiccation?

FORMANOWICZ, Daniel R., Jr. Predation by giant crab spiders on the Puerto Rican tree frog, *Eleutherodactylus coqui*.

FOUQUETTE, M. J., Jr. Comparison of vocalization types and temperature effects in western spadefoot toads, *Scaphiopus* (*Spea*).

FREED, Arthur N. An adaptive advantage of basking behavior in an anuran amphibian.

FROGNER, K. J. & R. F. Inger. A tadpole community in streams in a Bornean rain forest.

GABY, Ronald, Steve Carney, Barbara Bohnsack, John Gleman, Neil Gillies, Mark McMahon. Ecology, distribution, reproduction and growth of *Crocodylus acutus* at a nuclear power plant site, Dade County, Florida.

GATTEN, Robert E., Jr. Anaerobiosis in freely diving painted turtles (*Chrysemys picta*).

GERMANO, D. J., and C. R. Hungerford. Reptile population changes with manipulation of Sonoran Desert shrub.

GILBOA, Itzchak. Database of systematic herpetology: applications and implications.

GILLINGHAM, James C. and David Clark. Snake tongue-flicking: transfer mechanics to Jacobson's organ.

GODLEY, J. S., D. T. Gross, D. A. Sutphen, G. T. Bancroft, N. N. Rojas, R. W. McDiarmid and W. E. Ackerman. Ecology of *Amphiuma means* in a central Florida lake system.

GODSHALK, Robert E.The genus *Paleosuchus* in Venezuela.

GODSHALK, Robert E. The status and ecology of the Orinoco crocodile, *Crocodylus intermedius*, in Venezuela.

GOELLNER, Ronald R. A visit to Stephen's Island, home of the tuatara.

GREGORY, Patrick T. Communal denning in snakes.

GRIGG, G. C., and L. E. Taplin. Physiological strategies by which *Crocodylus porosus* live in sea water.

GRITIS, Paul A. Variability of scalation characters in the sea snake *Lapemis* (Hydrophiidae).

HALL, Russell J. and Bernard M. Mulhern. Are amphibians heavy metal accumulators?

HARLOW, Peter and Gordon C. Grigg. "Shivering thermogenesis" in the brooding diamond python *Python spilotes spilotes*.

HART, Donald R. Resource partitioning among Louisiana turtles of the genus *Chrysemys*.

HEDGES, S. Blair. Growth and reproduction of *Eumeces inexpectatus* in northeastern North Carolina and southeastern Virginia.

HENDERSON, Robert W. and Mary H. Binder. The ecology and behavior of the vine snakes: a review.

HOLMSTROM, William F., and John L. Behler. Post-parturient behavior in the anaconda (*Eunectes murinus*).

HUNT, Lawrence E. Morphological variation in Mexican populations of *Anniella* (Sauria:Anguidae).

HUNT, R. Howard, and Myrna E. Watanabe. Maternal offspring interactions of the American alligator, *Alligator mississippiensis*.

INCHAUSTEGUE, Sixto J., Jose A. Ottenwalder, Carlos Sanlley and David G. Robinson. The reproductive biology of *Crocodylus acutus* in the Enriquillo Lake, Dominican Republic.

IVERSON, John B. and Walter Auffenberg. Status and biology of Bahaman Archipeligo rock iguanas (*Cyclura*).

JACOBSON, Elliott. Diseases of crocodilians.

JACOBSON, Elliott. Blood sampling and necropsy techniques.

JANSEN, Deborak K. and Raymond K. Anderson. A radio-telemetry system for anurans.

JAROŠOVÁ, Jiřina. Ontogeny of the carpal bones of representatives of five extant anuran families: paleontological and phylogenetic comparisons.

JOHNSON, Tom R. Rare and endangered amphibians and reptiles of Missouri.

KARNS, Daryl R. Ecological risks for amphibians at toxic bog water breeding sites in northern Minnesota.

KLEESE, William C. and Duane P. Flamig. Environmental temperature effects of myosin ATPase activity in juvenile *Crotalus atrox*.

KLEMANN, Stephen Wm. and Jack C. Vaughn. Genome composition of *Desmognathus fuscus*, *D. ochrophaeus* and *D. quadramaculatus* and its relationship to the evolution of amphibians.

KOFRON, Christopher P. The *Tropidodipsas* complex of the genus *Sibon* (Serpentes, Colubridae).

KROHMER, Randolph W. and Robert D. Aldridge. Temperature regulation and habitat preference in the lined snake, *Tropidoclonion lineatum*.

KRUSE, Kipp C. and Jack C. Bragg. Mate selection in the American toad, *Bufo americanus*: size ratios of naturally occurring amplectant pairs.

KUSHLAN, James A. and Frank J. Mazzotti. Status of American crocodile in southern Florida.

LABANICK, George M. Inheritance of the red-cheeked and red-legged traits in the salamander *Desmognathus ochrophaeus*.

LANG, Jeffrey W. Thermal preferences of crocodilians.

LANG, Jeffrey W. Reproductive behaviors of New Guinea and saltwater crocodiles.

LAYNE, Jack R. and Dennis L. Claussen. Thermal acclimation rate of CTMAX and CTMIN in the salamander *Eurycea bislineata*.

LAZELL, James D. Herpetofauna of the British Virgin Islands.

LEE, Julian C. and Martha L. Crump. Morphological correlates of male mating success in *Triprion petasatus* and *Hyla marmorata* (Anura: Hylidae).

LOVISEK, Jim. The reproduction of *Caiman crocodilus yacare* in central Bolivia.

LUTICK, Gwynne K. Nitrogenous composition of urine in captive reared *Chelonia mydas*.

MacCULLOCH, Ross D. Movements of *Chrysemys picta belli* in a Saskatchewan river.

MALARET, Luis. Reproductive and fatbody cycles in *Crotaphytus collaris* in Kansas.

MARCELLINI, D. L. and Alan Peters. Preliminary observations on endogenous heat production after feeding in *Python molurus bivittatus* (Reptilia, Serpentes, Boidae).

McCOY, C. J. and Richard C. Vogt. Community structure and sex ratios in southern river turtles.

MEDEM, Federico. The breeding biology of the black caiman (*Melanosuchus Niger*)—what we don't know.

MEDEM, Federico. Some aspects of the breeding biology of the crocodilian genus *Paleosuchus* in Colombia.

MESSEL, H. and G. C. Vorlicek. Survey techniques and analysis for populations of *Crocodylus porosus* in tidal river systems.

MESSEL, H., and G. C. Vorlicek. The mortality, growth and movement of hatchling *Crocodylus porosus* on the Blyth-Cadell river systems, northern Australia.

MILLER, Kirk. Biochemical correlates of improved swimming performance following endurance training in *Xenopus laevis*.

MOLER, Paul E. Aspects of the biology of *Crocodylus acutus* in Florida.

MOLL, Edward O. The Illinois mud turtle: status and controversy.

MOLL, E. O., K. W. Matson, E. B. Krehbiel. The histology of color change in the Asian river turtle, *Callagur borneoensis*.

MOODY, Scoptt M. Homology and microstructure of the femoral-inguinal follicular glands and the precloacal-abdominal callous glands of the epidermis of lizards.

MORRIS, Michael A. The silvery salamander, *Ambystoma platineum*, in Illinois.

NELSON, Craig E. Affinities among new world microhyline frogs, an overview.

NOESKE, Teresa A. The effect of temperature regime on daily variations

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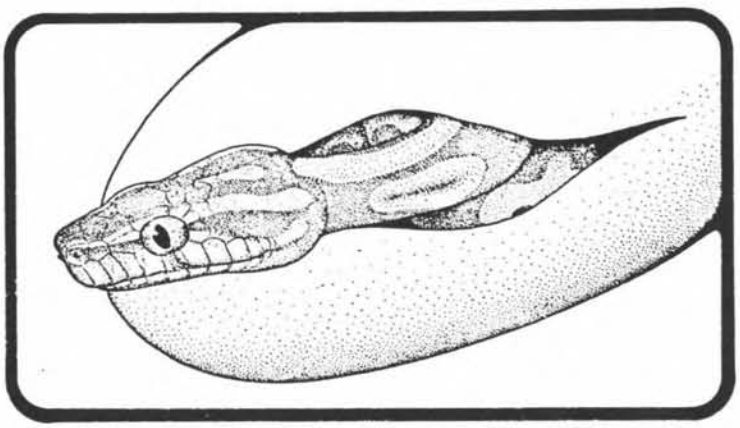
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●Part II: Reproductive Biology
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CARPENTER *An Ethological Approach to Reproductive Success in Reptiles*
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MENGDEN ET AL. *Semen Collection, Freezing and Artificial Insemination in Snakes*
REGAL *Temperature and Light Requirements of Captive Reptiles*
HONEGGER *Breeding Endangered Species of Reptiles*
EHRENFELD *Commercial Breeding of Captive Sea Turtles: Status and Prospects*
BACON *Some Observations on the Captive Management of Galapagos Tortoises*
WAGNER *Gecko Husbandry and Reproduction*
MENDELSSOHN *Observations on a Captive Colony of* Iguana
HUFF *Captive Propagation of the Subfamily Boinae with Emphasis on the Genus* Epicrates
ROSS *The Breeding of Pythons in Captivity*
ZWEIFEL *Aspects of the Biology of a Laboratory Population of Kingsnakes*
JOANEN & McNEASE *Reproductive Biology of the American Alligator in Southwest Louisiana*
HUNT *Propagation of Morelet's Crocodile*
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KLEESE *Environmental Effects upon Herpesvirus Infections in Captive Green Sea Turtles*
MARCUS *Bacterial Infections in Reptiles*
BUSH ET AL. *Recommendations for Antibiotic Therapy in Reptiles*
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FOWLER *Summary of Papers on Diseases*

●*Index*

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in reproductive and fattening indices in male *Anolis carolinensis* (Sauria:Iguanidae).

NOWAK, Robert T. Newt, *Taricha granulosa*, skin homogenate produces a sustained contraction of rat uterine muscle.

PACKARD, Gary C., and Mary J. Packard. The crocodilian egg: physiology and its relation to successful incubation.

PACKARD, Gary C., Mary J. Packard, and Thomas J. Boardman. Water exchange of eggs of painted turtles (*Chrysemys picta*).

PACKARD, Mary J., Gary C. Packard, Thomas J. Boardman. Water balance of eggs of zebra-tailed lizards (*Callisaurus draconoides*).

PETERSON, C. R. Body temperature variation in free-living wandering garter snakes.

NO AUTHOR GIVEN. Growth rates of sympatric species of snakes on the Sand Prairie Natural History Reservation in central Kansas.

PLUMMER, Michael V. Female reproduction in an Arkansas population of rough green snakes (*Opheodrys aestivus*).

POOLEY, A. C. Reproductive biology of *Crocodylus niloticus*.

RALIN, Dennis B., Michael A. Romano and C. William Kilpatrick. The tetraploid tree frog *Hyla versicolor*: evidence for a single origin from the diploid *H. chrysoscelis*.

RAND, A. Stanley and K. Troyer. Reduced parental care in *Crocodilus acutus* in Panama: causes and implications.

REGAN, Gerald T. Range limits: where and when the population drops to zero for *Acris*.

RHOTEN, William B. Culture of the anolian pancreas.

ROBLE, Steven M. The reproductive biology of *Pseudacris triseriata* in northeastern Kansas.

SAJDAK, Richard A. Habitat selection and seasonal activity patterns of the mudpuppy, *Necturus maculosus*, in a Wisconsin stream.

SCHLEFER, Ellen K. Acoustical and morphological analysis of the introgression between two species of treefrogs, *Hyla gratiosa* and *Hyla cinerea*, following twenty years of hybridization.

SEALE, Dianne. Physical factors influencing oviposition by the woodfrog (*Rana sylvatica*).

SEALE, Dianne, Karin Hoff and Richard Wassersug. The *Xenopus laevis* larva: a model suspension feeder.

SEIGEL, Richard A. Growth rates, sex ratio, and population structure of diamondback terrapins, *Malaclemys terrapin*, from the Atlantic coast of Florida.

SEVER, David M. Histochemical comparisons of cloacal gland clusters among male salamanders of the families Ambystomatidae, Salamandridae and Plethodontidae.

SHINE, Richard. The evolution of reptilian viviparity in cold climates.

STATON, Mark A. Variation in some reproductive attributes of *Caiman crocodilus* from the Venezuelan llanos.

STEWART, Margaret M. Seasonal and site variations in population densities of the Puerto Rican *Eleutherodactylus coqui*.

STANDORA, E. A., M. J. Vargo and I. L. Brisbin, Jr. Body temperature profiles of free-ranging *Chrysemys scripta* obtained by multi-channel telemetry.

STEGBAUER, Scott and John E. Minnich. Effects of hydration state and hormones on ultrastructure of the lizard cloaca.

STEGBAUER, Scott A. and John E. Minnich. Effects of hydration state and hormones on ultrastructure of the lizard salt gland.

STOCKARD, M. E. and R. E. Gatten, Jr. Aerobic and anaerobic energy metabolism in freely-diving *Chrysemys picta*.

TILLEY, Stephen G. Morphological and genic analyses of the *Desmognathus fuscus* complex in the southern Appalachian mtns.

TOWNSEND, Daniel S. Parental care by the Puerto Rican frog, *Eleutherodactylus coqui*.

TOWNSEND, Daniel S. and M. M. Stewart. Reproductive biology of *Eleutherodactylus coqui* with comments on seasonality.

TRAKSHEL, Gary M. and Sheldon I. Guttman. Plasma proteins of the American toad, *Bufo americanus*. II. Analytical electrophoretic separation of plasma transferrin.

TUTTLE, Merlin D., Lucinda K. Taft and Michael J. Ryan. Detection and evasion of fringe-lipped bats (*Trachops cirrosus*) by the common pond frog (*Physalaemus pustulosus*).

TUTTLE, Merlin D. and Michael J. Ryan. Bat predation and the evolution of frog vocalizations in the neotropics.

VALENTINE, Lance. Plasma testosterone in captive and wild-caught male alligators with preliminary observations on the spermatogenic cycle.

VON ACHEN, Penny and Nancy L. Zuschlag. Responses of neonate reptiles to prey object extracts.

WALDMAN, Bruce and Michael J. Ryan. Advantages of communal egg deposition in wood frogs (*Rana sylvatica*).

WEATHERBY, Craig A. Status of various disjunct populations of natricine snakes.

WEATHERBY, Craig A. Preliminary results of an electrophoretic analysis of three turtle species of the genus *Pseudemys*.

WEBB, Grahame J. W. A near pristine population of *Crocodylus johnstoni*.

WEBB, Grahame J. W. A comparison of *Crocodylus johnstoni* and *C. porosus* nesting strategies.

WEBB, G. J. W. Analysis of *C. johnstoni* feeding habits.

NO AUTHOR GIVEN. Herpetogeography in the Mazatlan-Durango region of the Sierra Madre Occidental, Mexico.

WEINHEIMER, C. J., D. Pendergast and J. R. Spotila. Peripheral blood flow in alligators as affected by diving and fear.

WHITAKER, Romulus, D. Basu, and Zahida Whitaker. The biology of the gharial, *Gavialis gangeticus*.

WHITAKER, Romulus, Zahida Whitaker, and Binod C. Choudhury. The biology of the mugger, *Crocoylus palustris*.

WILLIAMS, Ernest E., and William E. Duellman. *Anolis fitchi*, a new species of the *Anolis aequatorialis* group from Ecuador.

WOOD, Fern and Kim Critchley. Semen collection by electroejaculation with the green sea turtle, *Chelonia mydas*.

MONEY FOR RESEARCH IN THE FEDERAL ENDANGERED SPECIES PROGRAM

Although it may seem otherwise when permits are required, there is a good deal more to the endangered species program than lists, permits, and bureaucratic paperwork. There is money: money for status surveys, summer salaries, basic research, and development of conservation and management programs. Because few individuals are seemingly aware of such funds, this paper provides a brief introduction, as well as a reference, to the availability of funds in the Federal Endangered Species Program.

There are two main sources of contract money involving the Fish and Wildlife Service Endangered Species Program: from Cooperative Agreements with individual states under Section 6 of the Endangered Species Act of 1973, and through direct grants from the Office of Endangered Species in Washington (primarily) or from one of six Regional Offices located in Boston, Atlanta, Twin Cities, Denver, Albuquerque, and Portland, Oregon (secondarily). The Cooperative Agreement program has been reviewed in detail (Anon., 1979a, 1979b) so I will not review it again here. Copies of these references may be obtained by writing to Ms. Dona Finnley, editor, *Endangered Species Technical Bulletin*, U.S. Fish and Wildlife Service, Washington, D.C. 20240. In brief, this program allows the allocation of two-thirds Federal matching funds for every one-third state funds directed toward the conservation of resident species. Table 1 provides a list of states which have signed a Cooperative Agreement with the Fish and Wildlife Service and the total Federal allocation since the Agreement program began. Not every dollar shown has been for research; much involves law enforcement, habitat acquisition, and employee salaries. However, a considerable amount remains for research on the status, distribution, life histories, and potential threats to various species. The species studied do not have to be on the Federal List of Endangered and Threatened Wildlife and Plants, but their survival must be of concern to state authorities. With regard to amphibians and

reptiles, Table 2 provides a list of Federal funds allocated by the states to the study and conservation of various species between 1976 and 1980.

The amount of money authorized for appropriation under the Cooperative Agreement program is set by Congress. In the past, some states have received a disproportionately large share of funds because few states had signed Agreements. However, as more states enter the program, money can be more equitably distributed. In the fiscal years 1981 and 1982, up to $12 million has been allocated to this program.

The Division of Federal Aid in the Fish and Wildlife Service administers the Federal Endangered Species Grant-in-Aid Program. However, the projects selected for funding are initially determined by the states themselves and are reviewed by the Division of Federal Aid to determine if they are in accordance with criteria set for funding. Therefore, individuals who desire more information about how to acquire research money through the Cooperative Agreement program should contact the department of their state wildlife agency that administers non-game activities. Questions about Fish and Wildlife Service involvement with the Cooperative Agreement program should be directed to: Division of Federal Aid, U.S. Fish and Wildlife Service, Washington, D.C. 20240 (phone 703-235-1526).

The Office of Endangered Species accepts unsolicited proposals for research on the biology and conservation of species that are federally listed or which may be candidates for the Federal list. There no set format for such proposals although all should be titled, discuss the application of research to conservation of the species in question, present a review of pertinent literature (if applicable), present an itemized budget, and give an account of the principal investigator's qualifications. Requests are best kept below $10,000, and should never include unnecessary items.

When a proposal is received, it is assessed as to its scientific merit and accuracy, the qualifications of the researcher(s), and how it fits in with the priorities and needs of the Fish and Wildlife Service. The proposal is reviewed by various scientists both within and outside of the Fish and Wildlife Service, the Regional offices (as necessary), Recovery Teams, and anyone else deemed appropriate. The review process can be very quick but, in general, can take many months. All requests should be submitted at least 6 months prior to the desired starting date and preferably earlier. Requests then fall into 3 categories: those accepted and funded, those rejected, and those accepted but whose funding is delayed pending the receipt of additional moneys to the program, if available, such as year-end money. It is best to submit proposals at the beginning of the fiscal year (October-November) instead of waiting until May or June when money for research contracts is usually committed. Money for contracts, like the issuance of permits, rarely coincides with the biological activity patterns of the animals to be studied.

Table 1. States with Cooperative Agreements and total Federal funds ($1,000's) allocated 1976-1980.

Alaska	30.0	Montana	30.0
Arkansas	304.4	Nebraska	93.4
California	4,448.0	Nevada	30.0
Colorado	2,949.5	New Hampshire	25.0
Connecticut	0.0	New Jersey	865.2
Delaware	40.9	New Mexico	64.3
Florida	1,127.6	New York	1,399.6
Georgia	720.0	North Carolina	917.1
Guam	0.0	Ohio	60.0
Idaho	30.0	Pennsylvania	505.4
Illinois	19.8	South Carolina	477.8
Iowa	16.4	South Dakota	165.7
Kansas	7.5	Tennessee	491.6
Maine	60.0	Utah	41.0
Maryland	617.5	Virginia	163.8
Massachusetts	25.0	Virgin Islands	30.0
Michigan	1,113.3	Washington	484.8
Minnesota	75.0	Wisconsin	394.5
Missouri	346.0		

Table 2. Federal funds to states with Cooperative Agreements for conservation activities related to amphibians and reptiles 1976-1980. E = endangered, T = threatened, T(S/A) = threatened by similarity of appearance.

Species	Federal Status	Federal Funds ($1,000's)	States
Amphibians			
Hellbender	N/A	43.4	MD.
Neuse River water dog	N/A	68.8	NC.
Santa Cruz long-toed salamander	E	43.0	CA.
Desert slender salamander	E	43.0	CA.
Larch Mtn. salamander	N/A	6.7	WA.
Silvery salamander	N/A	4.6	IL.
Jefferson salamander	N/A	39.7	MD.
Eastern tiger	N/A	32.4	MD., NJ., NY.
Blue-spotted salamander	N/A	0.3	NJ.
Misc. other salamanders		16.	NJ.
Pine Barrens treefrog	E (FL.)	15.5	FL., NJ., SC.
Southern gray treefrog	N/A	0.3	NJ.
Misc. amphibian surveys		107.8	CA., FL., MA., MI., NY.
Reptiles			
American crocodile	E	24.5	FL.
American alligator	E,T,T(S/A)	326.1	AR., FL., GA., NC., SC.
Bog turtle	N/A	83.3	MD., NJ., NY.
Plymouth red-bellied turtle	E	5.3	MA.
Gopher tortoise	N/A	14.6	GA.
Green turtle	E, T	19.1	FL.
Loggerhead sea turtle	T	280.8	FL., GA., NC., SC.
Misc. sea turtles		36.9	NJ., NY., V.I.
Blunt-nosed leopard lizard	E	543.1	CA.
Island night lizard	T	12.2	CA.
San Francisco garter snake	E	43.0	CA.
Atlantic salt marsh snake	T	18.0	FL.
Eastern indigo snake	T	18.9	GA.
Pygmy rattlesnake	N/A	14.6	TN.
Eastern timber rattlesnake	N/A	2.7	NJ., NY.
Massasauga	N/A	12.7	NY.
Misc. reptile surveys		107.8	CA., FL., MA., MI., NY.

Table 3. Research grants on amphibians and reptiles awarded by the Endangered Species Program, 1979-1980.

Amount	Title
$ 9,986.	The status of the Plymouth red-bellied turtle, *Chrysemys rubriventris bangsi*, from Plymouth, Massachusetts.
2,892.	An assessment of *Caiman latirostris* and *Caiman crocodilus yacare* in northern Argentina.
15,000.	Support for World Conference on Sea Turtle Conservation.
9,688.	Distribution and population status of the ringed sawback (*Graptemys oculifera*), blotched sawback (*Graptemys flavimaculata*), and black-knobbed sawback (*Graptemys nigrinoda*) in Alabama and Mississippi.
45,490.	Investigation of the reproductive ecology, captive propagation and restocking potential of the eastern indigo snake.
10,000.	The status and distribution of *Nerodia harteri paucimaculata*.
5,000.	A survey of the present distribution of the desert tortoise (*Gopherus agassizi*) in Arizona.
20,000.	Surveillance of the crocodile population near Turkey Point, Florida, 29 July to 31 December 1979.
4,000.	Distribution of the Pine Barrens treefrog in Florida.
4,000.	Distribution and population status of the Alabama red-bellied turtle (*Pseudemys alabamensis*).
21,878.	Captive propagation and release program for the Houston toad.
10,000.	Autecology of the Bolson tortoise, *Gopherus flavomarginatus*.
10,000.	Continuation of studies on the Plymouth red-bellied turtle.
1,000.	Leatherback turtle survey in the Dominican Republic.
28,000.	Effect of incubation temperature on sex of hatchling Pacific ridley (*Lepidochelys olivacea*) and Pacific green (*Chelonia mydas agassizii*) turtles.
34,000.	Biological studies directed to the conservation of olive ridley sea turtles.
6,000.	Living tags for hatchling sea turtles.

In addition to the Washington office, each Regional office may fund some contracts, although they are limited by the generally smaller amounts of money available. The Regions also fund proposals more in line with their own immediate needs, and therefore are more likely to solicit individuals to perform needed work. A list of research proposals for amphibians and reptiles approved by the Office of Endangered Species during 1979-1980 is provided in Table 3 to give an idea of the type of grants and the amounts which have been funded in the past. All grant requests should be submitted to: Director/ OES, U.S. Fish and Wildlife Service, Washington, D.C. 20240. Questions concerning the grant program should be directed to Mr. Amos Eno at the Office of Endangered Species (phone 703-235-2407).

ACKNOWLEDGEMENTS

I thank Dona Finnley and James D. Williams for providing information and comments on the manuscript.

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Anon. 1979b. Congressional add-on to keep grant-in-aid program afloat. Endang. Sp. Tech. Bull. 4(12): 3-5.

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U.S. Fish and Wildlife Service
Washington, D.C. 20240

HERPETOLOGY AT THE SAVANNAH RIVER ECOLOGY LABORATORY

The Savannah River Ecology Laboratory (SREL) is staffed and operated by the University of Georgia. The laboratory is located near Aiken, South Carolina, on the Savannah River Plant (SRP), a 300-square mile tract of land owned by the United States Department of Energy. A unique feature of the site is that it is completely isolated from the public for security reasons. Thus, long-term and extensive field studies are possible with minimal concern for any type of disturbance to study sites or equipment.

The SRP is located in the Upper Coastal Plain and has a diversity of natural and man-made aquatic and terrestrial habitats which provide a unique opportunity for field studies. Among the terrestrial habitats are pine and hardwood forests, turkey oak stands, upland sandhills, and cypress-black gum forests along the Savannah River. The U.S. Forest Service manages part of the land for timber so that a succession of habitat types from clear-cuts to 30-year-old pine stands can be found.

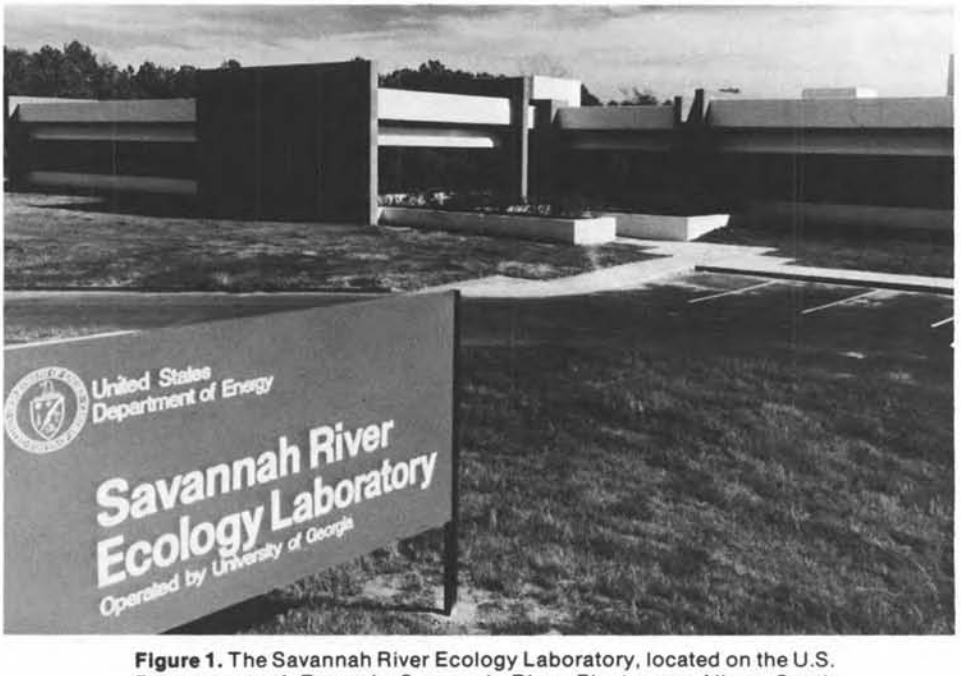


Figure 1. The Savannah River Ecology Laboratory, located on the U.S. Department of Energy's Savannah River Plant near Aiken, South Carolina.

Aquatic habitats include ponds, small lakes, blackwater streams, springs, the Savannah River, and a 3000-acre reservoir. Carolina bays, the unique lentic habitats of the southeastern Atlantic Coastal Plain, are common on the SRP and are represented by several dozen of various sizes.

The diversity of habitat types on the SRP in combination with a rich herpetofauna is proving valuable in field studies of reptiles and amphibians. Research, both field and laboratory, is carried out by SREL's resident staff, graduate and undergraduate students, and visiting faculty.

Most ecological research on reptiles and amphibians of the SRP has been conducted within the last decade. In fact, with the exception of a general survey in the early 1950's by W. H. Freeman and a single paper in *Herpetologica* by E. D. Bellis in 1964, the first ecological studies in herpetology on the SRP did not emerge in the literature until 1968.

Herpetologists in residence at SREL at this time are: J. Whitfield Gibbons (who is also Associate Director) and Janalee P. Caldwell. Other staff members at SREL who conduct studies on amphibians and reptiles include Michael H. Smith (Director) and I. Lehr Brisbin.



Figure 2. Jan Caldwell and Garfield Keaton check a drift fence and record information on a marked population of turtles. Several populations of turtles and amphibians on the SRP are the focus of long-term capture-recapture studies.

Whit Gibbons is continuing his long-term studies on the population biology of aquatic turtles of the SRP. Several thousand individuals from numerous populations are now marked. Many recaptures are of animals that were originally captured 10-13 years ago. In his studies, which address evolutionary and ecological questions, sampling and monitoring techniques include drift fences and pitfall traps, radiotelemetry, and X-ray photography, as well as more conventional methods. Working with him on the turtle projects is Judy Greene who first demonstrated the effectiveness of X-ray photography in reproductive studies. Garfield Keaton is actively involved in these turtle studies and is concentrating on orientation and terrestrial migratory phenomena of all local species. Dr. Justin Congdon recently joined the SREL postdoctoral staff to work on the turtle projects under Gibbons' recently funded NSF grant. In addition to the turtle research, Gibbons is also analyzing earlier-collected data sets from herpetological studies. These include examination of reproductive and activity cycles of local snakes from collections of more than 2000 road-killed animals and analysis of amphibian activity cycles based on samples collected at several drift fences. Involved in the analysis and interpretation of certain aspects of these data are Pat Murphy, Karen Patterson, Ray Semlitsch, Joe Schubauer, Judy Greene, and Garfield Keaton.

Jan Caldwell's research interests center around amphibian population biology. In addition to continuing studies on antipredator mechanisms and survival in tadpole populations, she is in the second year of a long-term study on population biology of several species of frogs and salamanders which breed in Carolina bays. Two bays are enclosed by drift fences and all animals moving in and out (more than 80,000 captures in the first year) are collected and individually marked so that various life history parameters can be examined. Ray Semlitsch is involved in these studies and, additionally, is using radioactive tags (Tantalum-182) to monitor the terrestrial activity of *Ambystoma talpoideum*. Gary Moran and Cindy Shoemaker provide technical help on these projects. In addition, Gary is analyzing data collected by means of the drift fences to establish whether individual frogs and salamanders migrate to and from the bays using the same corridors.

The primary herpetological focus of I. Lehr Brisbin has been on bioenergetics of reptiles. One long-term study has been a determination of energy budgets of captive kingsnakes; total caloric intake (feeding) and production (growth) have been measured in some specimens for over 13 years. Brisbin has also investigated behavioral responses of alligators in a large reservoir to thermal effluents from SRP nuclear reactors. In these studies, Brisbin and University of Georgia graduate student Tom Murphy capitalized on thermal aquatic gradients on the SRP by using radiotelemetry to examine fall and winter movement patterns of individuals during periods when the species is normally dormant.



Figure 3. Kent Brown (left), graduate student from Texas Christian University, and Steve Bennett, graduate student from the University of Georgia, use the drift fence technique in their studies of the effects of various land management practices on the herpetofauna.



Figure 4. An albino *Kinosternon subrubrum* collected as a hatchling on the Savannah River Plant.

Mike Smith's herpetological research has centered around genetics questions and the revelation of genetic patterns through the use of electrophoresis. He has completed or has in progress major projects with certain freshwater and sea turtles, Puerto Rican frogs, and the American alligator.

Graduate student projects have been a major contribution to the research output of SREL. More than a dozen doctoral and master's theses have been based on herpetological field studies on the SRP. Recently completed theses include Karen K. Patterson's studies of paedogenesis in *A. talpoideum*, Thomas M. Murphy's research on the ecology of alligators, Robert Parmenter's examination of diet selection in aquatic turtles, and Patricia Murphy's determination of the orientation capabilities of juvenile alligators. Several other theses are in the final stages. Edward Standora carried out an extensive investigation of thermoregulatory phenomena in alligators and turtles. Besides the biological findings that will come from this work, Standora's contribution to the design and utilization of microtelemetry should prove to be outstanding. Joseph P. Schubauer has completed his research on movement patterns of aquatic turtles in the heated reservoir system where he successfully monitored the movement of more than 30 *Pseudemys scripta* equipped with radio transmitters. William Etges has finished his research using electrophoretic techniques on 14 species of frogs on the SRP to establish the relationship between genetic patterns and environmental variability. Other graduate student projects in progress at this time are those of Stephen H. Bennett and Kent L. Brown. Both are using the drift fence and pitfall trap sampling technique to address questions of how land management programs of the U.S. Forest Service influence the herpetofauna.

SREL also has an active program of research participation for undergraduates. Most students spend 10-12 weeks in residence at SREL, usually in the summer, and work under the direction of a particular senior staff member. SREL graduate and undergraduate students are from various schools throughout the country: Standora, Etges and Bennett are



Figure 5. Joe Schubauer and Ed Standora, graduate students from the University of New York at Buffalo and the University of Georgia, respectively, fit a turtle with a transmitter for use in studies of movement and thermoregulation.

from the University of Georgia; Schubauer is from the State University College at Buffalo; Brown is from Texas Christian University.

SREL has a visiting faculty research program whereby faculty members from any institution may apply to conduct research for a short period (several weeks) or for as long as a year (sabbatical leave). During the past few years, several herpetoogists have worked on field projects at SREL. The following is a partial list including the nature of their research: Robert D. Aldridge, St. Louis University, Reproductive cycles of temperate zone snakes; Donald L. Moll, Southwest Missouri State University, Comparative feeding relationships among freshwater turtles; Gary Ferguson, Texas Christian University, Ecological and evolutionary aspects of lizard populations; Donald W. Tinkle, University of Michigan, and Royce Ballinger, University of Nebraska, Comparative demography of lizard populations; Ronn Altig, Mississippi State University, Ecology and morphology of anurans; James Spotila, State University College at Buffalo, Thermoregulation and climate space modeling of large reptiles.

Visitors, including faculty with classes on herpetology field trips, are welcome at SREL within certain limitations. Anyone contemplating a visit to SREL and the adjacent field sites should be aware that a visitor's security badge is necessary to gain entrance to the area. In addition, any visitors to the field must be U.S. citizens and be accompanied at all times by someone on the SREL staff. Field groups cannot visit the SRP without having made prior arrangements for such escort. While it is not difficult to obtain badges for U.S. citizens, a 10-day notice is required for those wishing to go into the field. Visitors who are U.S. citizens can tour the laboratory facilities without advance notice.

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MORE ON BIPES

THERE IS NO EVIDENCE THAT *BIPES* OCCURS IN THE U.S.

Campbell (1980, Herp Review 11(1):6-7) has resurrected the early observations of a two-legged lizard on the South Platte river, perhaps between Ogallala, Nebraska and Julesburg, Colorado. He has suggested that the assignment of the name *Chirotes* by professional zoologists was sufficient indication that the collectors were dealing with an amphisbaenian. Negative evidence is never satisfactory. As amphisbaenians (though members of a different family,) once inhabited the American West it is possible that some forms survived. However, evidence for their occurrence should be stronger than that now available.

The key factor in the original description seems to be in the statement "they were so active, that it was not without some difficulty that we succeeded in obtaining a specimen" (James, 1823). We have collected and handled a goodly number of amphisbaenians and have never found any difficulty in catching them once they were disclosed. Almost all known species and particularly *Bipes* move relatively slowly; even when trogonophids go into their saltatory escape behavior there is no problem in catching them. Furthermore, the known species of *Bipes* are almost never found active on the surface. During field studies on *Bipes*, in which over 3000 individuals were encountered, all except three were dug up from underground. These three were found crawling slowly on the surface at night. Whatever the animal observed by James, it is most unlikely to have been an amphisbaenian.

Secondly, reference to the Cuvierian name *Chirotes*. In 1820 the forms in question were still in a major state of confusion. It was not until some years later that the affinities of the several two-legged and limbless amphibians and reptiles were sorted out by Müller. Consequently the suggestion that *Bipes* was misidentified by Edwin James or Thomas Say does not insult their memory; it is remarkable that these early explorers did as well as they did.

As there is no other direct observation, and all "reports" of *Bipes* from the central U.S. followed rather than preceded local inquiries for such animals, it seems best to delete such "records" from future field guides.

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A COMMENT ON J. HOWARD CAMPBELL'S *BIPES* REPORT

Campbell's (1980) speculation that reports of *Bipes* in Nebraska or Colorado might be valid brings to mind my experience with a report of relatively recent vintage. On June 11-12, 1951, I was collecting in Brady County, Nebraska, 21 miles north of North Platte along U.S. Highway 83, in the so-called Sandhills region. At that time U.S. 83 ceased to be a paved road just north of my collecting sites and became an unmarked sandhills trail, one in which a car could easily bog down in loose sand. I had collected specimens of three lizard species, *Sceloporus undulatus, Holbrookia maculata,* and *Eumeces multivirgatus* and while searching on the ranch of A.J. Simants of Tryon, Nebraska, I had a chat with Mr. Simants and his children. They claimed that—and I quote my field notes—"There is in this area a lizard with only two legs, these near the head. It is said to crawl like a snake and reaches a length of a foot or so. Grayish or silvery grayish in color. Found along fence rows or fence posts." One of the Simants' children, a lad of about 13, described the other lizards of the area accurately enough so that without him seeing my catch I was convinced that he recognized the conventional lizards that were to be found there. He also seemed to know the various snakes of the area. I recall also that the young man accompanied me to some refuse piles and told me that they were most apt to encounter the "two-legged lizard" when excavating for fence posts or when pulling up rotting fence posts.

My notes also state, "Here again we hear of an amphisbaenid-like animal in Nebraska. Could it be?" I do not recall my source of knowledge of amphisbaenid reports but suspect it came from Taylor's (1938) note. Thus to return to the idea of present day existence of amphisbaenids in Nebraska I note that geologists claim that the Sandhills were a refugium during the Pleistocene. Admittedly the climate then probably was quite cool and moist but summers could have been mild and a fossorial creature could possibly have thrived there. That such a creature could avoid detection today is not surprising; the area is poorly collected and fossorial species are inconspicuous in any event. Even in Florida where *Rhineura floridana* probably is a common species the number of records is few despite extensive collecting activity. Florida collectors have told me that many of the known specimens were discovered as a result of the lizards accidentally falling into man-made, concreted excavations; thus, discovery of the lizard by a herpetologist in the field appears to be an infrequent event. I therefore inclined to concur with Campbell that Edwin James' report may indeed be valid.

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PLEASE RESPOND

The SSAR has taken a stand against H. R. 4805, the "Research Modernization Act." Reasons for this position were outlined in Herpetological Review 11(2):28-29. The proposed legislation may have rather broad reaching ramifications for those conducting research on live animals. Please review the position of the SSAR and immediately write your local congressmen as you deem fit. If you would like a copy of the bill, contact Hugh Quinn, Department of Herpetology, Houston Zoological Gardens, 1513 Outerbelt Dr., Houston, Texas 77030. ●

CURATION OF COLLECTIONS

A report on current supplies and practices used in curation of ichthyological collections appeared recently. This report was put together by an ad hoc subcommittee of the American Society of Ichthyologists and Herpetologists' Ichthyological Collection Committee. The 63 page report summarizes the results of a survey and questionnaire designed to determine the curatorial techniques and procedures used in major ichthyological collections and the products found most useful in their maintenance and curation. In addition, recommendations pertinent to the primary areas covered are included.

The report is divided into six sections and discusses the following topics: Fixation and Preservation, Specimen Containers, Inks and Labels, Collection Environment, Electronic Data Processing, and Compactors. Included in the five appendices are names and addresses of dealers and suppliers that handle the bottles and paper supplies discussed. While some parts of the report are pertinent only to the curation of fishes, much of the information and most of the discussion is equally applicable to the curation of amphibian and reptile collections. Herpetologists responsible for the curation and maintenance of collections would be well advised to read this important and well documented report. It not only provides a ready source of valuable information, but also considers issues and procedures crucial to the long term maintenance of these national resources. Dr. William L. Fink and his committee are to be commended for this timely and well done report. A limited number of copies are available from: Smithsonian Oceanographic Sorting Center, Smithsonian Institution, Washington, DC 20560, Attn: Dr. Leslie W. Knapp. *ASIH-HL-SSAR Joint Committee on Management of Systematic Resources in Herpetology.* ●

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Techniques

AN EFFECTIVE METHOD OF PRESERVING LARGE REPTILES

Large reptiles, primarily because of difficulties of injection and storage containers, are rarely preserved whole as museum specimens, despite their obvious usefulness as museum reference materials. Cook (1965) suggested disarticulation and individual preservation of the more conveniently sized portions of the animal. A recent opportunity to preserve a whole Leatherback, *Dermochelys coriacea*, the largest and perhaps the rarest of the marine turtles, resulted in the innovation of a deep injection apparatus, and this plus the storage tank are outlined in this note.

On 11 September 1978, an adult male Leatherback Turtle, *Dermochelys coriacea*, was found entangled and drowned in cod nets by Blair and Robert Clow off Grant Tracadie, Prince Edward Island. The specimen obtained, an adult male, was 2.08 m from snout to tail tip, (1.42 m shell length) and weighed approximately 450 kg. It was placed in a cold storage plant and frozen soon after being landed. Through the cooperation of John Gilhen of the Nova Scotia Museum, the animal was obtained by the National Museum of Natural Sciences. It was shipped to Ottawa by refrigerated transport and held in cold storage.

On the morning of 1 December 1978, the specimen was moved by truck to the taxidermy unit where it was thawed gradually at approximately 10°C. By that afternoon the thin edges of the flipper had become flexible and during the next day formalin (20%) was injected with a 25 cc Luer Lock veterinary syringe (equipped with a 50 mm, 16 gauge needle) into the flippers, eye sockets and superficial muscles of neck and tail, as well as the penis which was frozen everted. Additional injections were were made over the next three days as thawing gradually proceeded. On 6 and 7 December, deeper injections were made to infiltrate most of the animal with formalin as thawing neared completion. Because commercial syringe needles available were too short for deep injections, a suitable needle, 50 cm in length was fabricated from 1/4 inch (= 0.62 mm) steel automotive brakeline. A one-way hand primer bulb (of the type frequently used to prime boat engines) was inserted between two lengths of aquarium tubing. The needle was inserted into the turtle through a small scalpel incision and connected to the outflow tube of the primer bulb. The inflow tube was placed in a 50% formalin solution. By periodically shifting the needle to new sites, approximately 30 l of solution were pumped into the specimen. This means that, if one considered the total volume of the turtle as a fluid, with the 30 l of 50% solution added, it would yield a total solution of approximately 5%. This apparatus (Figure 1), easily constructed from readily available materials, proved very effective for deep injection. It is noteworthy because it could also be as useful for field injection of large specimens.

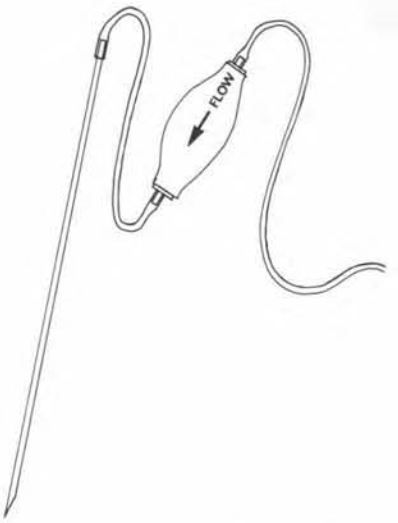


Figure 1. Apparatus used for deep injections.

Permanent storage was possible in a rectangular tank constructed of 2.5 cm plywood, fiberglassed (epoxied) both inside and outside, and reinforced externally with angle iron girdling the tank midway up the sides.

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This tank had been prepared by the Technical Services Division of the National Museums of Canada some years previously in anticipation of the acquisition of a large marine turtle. The specimen after injection was lifted into the tank with block and tackle and the container "topped up" with 1350 l of 20% formalin to totally immerse the specimen. The turtle will be transferred later to 50% isopropyl alcohol.

In the field, large specimens, injected by the method outlined here could be wrapped in some suitable formalin-soaked material, encased in plastic and shipped to a museum for permanent storage.

We are indebted to Terry Morgan and the staff of the Taxidermy Section of the National Museum of Natural Sciences for patience and assistance, and to Franc , Cook who braved preservative fumes to encourage us and help us with the manuscript.

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Herpetological Husbandry

This section of **Herpetological Review** deals specifically with the husbandry of captive reptiles and amphibians. Articles concerning any aspect of successful exhibit design, techniques for maintenance and breeding, egg incubation, and rearing of the young are acceptable based on the success of the husbandry program, the quality of written work, and the overall value of the presented material to the herpetological community. Reproductive articles should stress the actual methods and specimen manipulation involved but may also include observations of behavior, growth, and statistical data. Of particular interest are reports describing consistently successful, long term programs which deal with large numbers of a single species or genus.

Longer husbandry manuscripts should be divided into appropriate sections including Literature Cited. Black and white photos and line drawings are acceptable. All manuscripts will be reviewed by the Section Editor, and frequently by another individual within the particular area of expertise. Reports which do not deal with herpetological husbandry *per se* (for example, the description of eggs and young from a wild-caught gravid female) will be forwarded to the Editor for consideration as a Feature Article. In order to reduce publication time, husbandry articles should be sent directly to the Section Editor, Bern W. Tryon, Dept. of Herpetology, Houston Zoological Gardens, Houston, Texas 77001.

CAPTIVE REPRODUCTION IN SONORAN BLACK KINGSNAKES (*LAMPROPELTIS GETULUS NIGRITUS*)

Reproduction data have been recorded for *Lampropeltis getulus splendida* (Wright and Wright, 1957), *L. g. californiae* (Perkins, 1952), and most other members of the *getulus* complex (Wright and Wright, 1957). However, scant reproduction data have been recorded for *L. g. nigritus* since being described by Zwiefel and Norris in 1955. This paper reports captive reproduction of *L. g. nigritus*, with notes on combat behavior.

In 1975 and 1976, the collection of *L. g. nigritus* at the Oklahoma City Zoo consisted of two males and one female. Male A (total length 108 cm, weight 453 g) was acquired February 1973; male B (total length 117 cm, weight 424 g) and the female (total length 98 cm, weight 211 g) were both acquired July 1974. All three were uniformly black dorsally with varying amounts of white ventral markings. Blaney (1977) described the pattern of *L. g. nigritus* as ranging from uniformly black both dorsally and ventrally to a reduced *L. g. splendida* pattern. He adds that the anal plate is always light colored.

The three adults were housed on exhibit in a plywood cage measuring 72 x 59 x 43 cm. The glass fronted enclosure was covered at the top with ¼ inch hardware cloth. The substrate consisted of sand with rocks for cover. Plastic plants decorated the enclosure. Lighting was supplied by two 75 watt Vita-lite flourescent bulbs (Duro-test Co.) suspended approximately 44 cm above the top of the enclosure.

Though no copulation was observed, breeding was believed to have first occurred in 1975, as on 9 June 1975, the female laid a clutch of four eggs. The young emerged from the eggs 59 days later (Grimpe, 1975).

Male A was removed from the enclosure in fall 1975 and placed in a plastic reserve cage alone. The reserve cage was kept in a separate part of the building, away from the exhibit cage. Male B and the female were left on exhibit throughout the winter.

On 7 March 1976, male A was reintroduced into the exhibit cage containing the pair of *L. g. nigritus* and combat behavior between the two males occurred immediately. During combat, both males crawled about the cage with their bodies intertwining as each attempted to place his fore body above his rival's. Periodically, biting was employed on the forward dorsal aspect of the rival. Shaw (1951) described similar combat behavior in *Lampropeltis triangulum annulata* as well as in members of the genus *Pituophis*.

L. g. nigritus Male A, appeared to exhibit dominance by the criteria of Carpenter and Gillinham (1977), as he maintained a posture of superiority and aggressiveness most frequently.

At 1430 hr. on 7 March 1976, male A was observed in coitus with the female. Coitus lasted more than two hours; male B generally remained in another portion of the cage. No further copulation was observed.

For several days following the observed copulation, both males were found with new superficial skin abrasions, indicating continued combat. This may also have been an indication that both animals, at times, exhibited dominance.



Fig. 1. Faintly patterned juvenile *Lampropeltis getulus nigritus.*



Fig. 2. Juvenile *Lampropeltis getulus nigritus* exhibiting *L. g. splendida* type pattern.

Several days before egg laying, the female, which had refused food for several weeks, began showing an increase in girth. She was placed in a reserve cage containing damp sphagnum to accomodate egg laying. On 16 April 1976, she laid five eggs (Table 1).

The eggs were incubated in damp sphagnum, contained in a crockery bowl. The bowl and eggs were sealed in a plastic bag which was opened approximately every other day to replenish oxygen. The temperature of the room in which the eggs were incubated generally fluctuated 27-32° C.

On 13 June 1976, after an incubation time of 59 days, all five young hatched. Total lengths and weights of the young were recorded (Table 2). Lengths were measured as described by Quinn and Jones, 1974. Measurements of young could not be correlated with their corresponding eggs, as the young emerged from the eggs unobserved.

The young varied in pattern considerably, from an almost totally black specimen with white markings on the underside (Fig. 1) to one that had exhibited a pattern similar to that of an adult *L. g. splendida* (Conant, 1958) (Fig. 2). Within two years ontogenetic changes reduced the pattern almost completely.

Table 1. Egg measurements for *Lampropeltis getulus nigritus*.

Egg #	Diameter (cm)	Length (cm)	Weight (g)
1	2.4	6.1	Total weight of egg clutch
2	2.2	5.7	113.3 (x = 22.7)
3	2.2	6.8	
4	2.3	5.5	
5	unavailable	6.5	

Table 2. Length and weights of newborn *Lampropeltis getulus nigritus*.

Young #	Total Length (cm)	Weight (g)
1	32.1	17.0
2	32.6	17.7
3	34.7	18.8
4	31.9	17.1
5	34.3	17.7

ACKNOWLEDGMENTS

I wish to thank Mike Blakely and the reptile staff at the Oklahoma City Zoo for their assistance. I am also grateful to Hugh Quinn and John Werler for critically reviewing the manuscript, as well as to Debbie Butler for typing it.

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Wright, A. H. and A. A. Wright. 1957. Handbook of snakes of the United States and Canada. Vol I. Cornell University, London. 564 pp.

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NEWSNOTES

BIOSIS TO COPUBLISH ZOOLOGICAL RECORD

Responsibility for the publication of **Zoological Record**, which annually indexes research reports appearing in over 6,000 journals in the animal sciences, will be assumed by BIOSIS beginning with Volume 115. **Zoological Record** has been published by the Zoological Society of London since 1864.

Under the new agreement, **Zoological Record** will be jointly published by BIOSIS and the Zoological Society. An Advisory Board will be formed under an independent chairman with equal repesentation from BIOSIS and the Zoological Society. Editorial Policy will be under the direction of an editor who will be appointed by the Zoological Society. ●

BOOK ANNOUNCEMENT

The Chihuahuan Desert Research Institute announces the availability of Contribution No. 87, "A Life History Study of the Gray-banded Kingsnake, *Lampropeltis mexicana alterna*, in Texas" by Dennis J. Miller.

This 55 pp. report includes 5 photos, 11 distribution maps, and 5 tables and charts. Topics covered include morphology, geographic distribution, definition of habitat, behavior, food, reproduction, mortality, husbandry, and the status of the Gray-banded Kingsnake as a non-game protected species.

Soft-bound copies are available at a cost of $5.00 ea. (Texas residents include 5% tax) from: The Chihuahuan Desert Research Institute, Box 1334, Alpine, Texas 79830. Include 50¢ for postage and handling. ●

PROPOSED ENDANGERED TURTLES

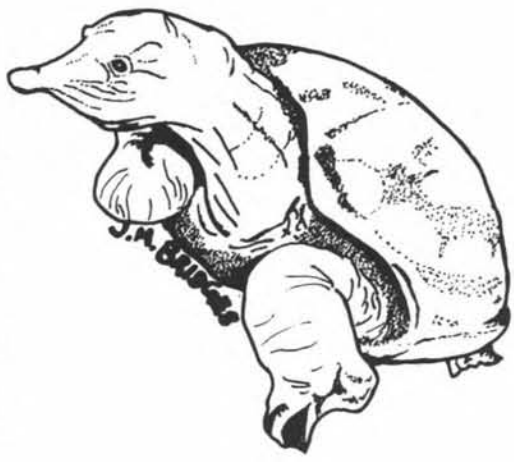
The following is from **FR** 45(138):47715.

As amended November 10, 1978, the Endangered Species Act mandates withdrawal of proposed rules to list species which have not been finalized within two years of the proposal. The amended Act also authorized a one-year suspension of all withdrawals, until November 10, 1979. The time limit has expired for the Key mud turtle (*Kinosternon bauri bauri*) which was originally proposed for listing as Endangered with Critical Habitat on May 19, 1978 (43 FR 21072-75). The Plymouth red-bellied turtle (*Chrysemys rubriventris bangsi*) which was proposed as Endangered with Critical Habitat in the same proposal was made final on April 2, 1980 (45 FR 21828-33). This notice constitutes the withdrawal of the Key mud turtle listing proposal.

●

RESEARCH REQUEST

John B. Iverson (Department of Biology, Earlham College, Richmond, Indiana 47374) is compiling a review of reproductive data for all possible turtle species as part of his continuing studies of turtle reproduction and reproductive strategies. Communications sharing unpublished reproductive data, especially for non-North American species and/or species rarely studied or reported upon would be greatly appreciated. All information so obtained will be cited as "personal communication" and duly acknowledged. ●



ANNUAL MEETING PHOTOS SOUGHT

The SSAR archives lack group photos from the annual meetings at Mt. Lake, Carbondale, Kansas City, Albuquerque, Lake Texoma, Auburn, Fullerton and Tempe. Persons who have these photos and would be willing to donate them should contact Henri Seibert (see inside front cover). The donation will be greatly appreciated. ●

DO YOU HAVE HOUSTON TOADS?

The Houston Toad Recovery Team is in the process of gathering information concerning *Bufo houstonensis*. Anyone having specimens or skeletal material of Houston toads is requested to send collection data to:

R. A. Thomas
Louisiana Nature Center
11000 Lake Forest Blvd.
New Orleans, LA 70127 ●

Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same.

These geographic distribution records have a **standard format,** and all authors should adhere to that format, as follows: SCIENTIFIC NAME, COMMON NAME (as it appears in **Standard Common and Current Scientific Names for North American Amphibians and Reptiles** , Collins, Huheey, Knight and Smith, 1978), LOCALITY, (use **metric** for distances), DATE (day, month, year), COLLECTOR(S), VERIFICATION BY, PLACE OF DEPOSITION AND CATALOG NUMBER (required), COMMENTS, CITATION(S), SUBMITTED BY (give name and address).

Some further comments. This geographic distribution does not publish "observation" records. Records submitted should be based on preserved specimens which have been placed in a university or museum collection (private collection depository records are discouraged).

Please submit new geographic distribution records in the **standard format** only to Joseph T. Collins, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. Short manuscripts are discouraged, and are only acceptable when data **cannot** be adequately presented in the standard format.

Recommended citation for new distribution records appearing in this section is: Jones, J. 1980. Geographic distribution: *Lampropeltis triangulum multistrata.* SSAR Herp. Review 10(1):1.

ANURA
CAUDATA

GASTROPHRYENE CAROLINESIS (Eastern Narrowmouth Toad). USA: KANSAS: Cherokee Co: 4.8 km S, 0.8 km W Lawton. 29 April 1972. V. E. Jones. Verified by Joseph T. Collins, Univ. Kansas Mus. Nat. Hist. Deposited in Museum of the High Plains (MHP 6081). Third known specimen from Kansas. The other two are as follows: Cherokee Co: 6.4 km N Baxter Springs. 27 April 1947. Edward Beasley (KU 24414); and Cherokee Co: 4.8 km N Galena. 24 April 1950. Irving Baird (KU 28622).

Submitted by **MICHAEL S. RUSH** and **EUGENE D. FLEHARTY**, Department of Biological Sciences, Fort Hays State University, Hays, Kansas 67601. ●

TESTUDINES

CHRYSEMYS NELSONI (Florida Redbelly Turtle). USA: GEORGIA: Ware Co: Okefenokee Swamp, Moonshine Ridge, 1.1 km N. Florida state line, 2.0 km W. Charlton County line. 28 April 1980. Two juveniles and one adult seined from small swampy area. Adult preserved (UGAMNH 07762). First record for state and extends range approximately 24 km north of previously recorded localities (Carr and Crenshaw. 1957. Bull. Florida St. Mus., Biol. Sci. 2: 25-42; Powers, A. 1977. Geographic distribution: *Chrysemys nelsoni.* SSAR Herp. Review 8(3):84).

Submitted by **LAURIE J. VITT**, Museum of Natural History, University of Georgia, Athens, Georgia 30602 and **ARTHUR E. DUNHAM**, Leidy Laboratory of Biology, University of Pennsylvania, Philadelphia, Pennsylvania 19104. ●

CLEMMYS GUTTATA (Spotted Turtle). USA: GEORGIA: Lee Co: 12.1 km N Leesburg on Ga. Rt. 377. 7 May 1976. Norman Bevan. Verified by V. N. Powders. Georgia Southwestern College Museum (GSCM 1643). Calhoun Co: Edison. 17 April 1975. B. McKinney and R. Bracken. Verified by R. H. Mount. Auburn University Museum (AUM 26741). New county records and confirms presence of species in southwestern portion of state, previous record near Albany being questionable (Conant, 1958, A field guide to reptiles and amphibians, Houghton Mifflin Co.).

Submitted by **CARLOS D. CAMP**, Department of Zoology-Entomology, Auburn University, Auburn, Alabama 36830, and **VERNON N. POWDERS,** Department of Biology, Northwestern Oklahoma State University, Alva, Oklahoma 73717. ●

PSEUDEMYS SCRIPTA ELEGANS (Red-eared slider). USA: Indiana: Harrison Co: 11.6 km south of Corydon on HWY 135. 22 April 1978. Adult male. J. Harry Reynolds Jr. Verified by Michael Seidel, N. Bayard Green Museum, Marshall University. Specimen deposited Carnegie Museum (CM 74019). First county record and extends range *ca.* 75 km southeast of the reported range in southern Indiana (Minton, S. A., Jr. 1972. The Reptiles and Amphibians of Indiana. Ind. Acad. Science.). A dead, adult specimen was also found *ca.* 14.2 km east of the above locality in an isolated farm pond 4.4 km north of Elizabeth, Harrison County, Indiana in May 1979 by S. L. Reynolds, but was not collected.

Submitted by **J. HARRY RENOLDS JR.**, 1516 Shelby Place, New Albany, Indiana 47150, and **SAMUEL L. REYNOLDS**, N. Bayard Green Museum, Department of Biological Sciences, Marshall University, Huntington, West Virginia 25701. ●

RHINOCLEMMYS PULCHERRIMA PULCHERRIMA (Mexican Wood Turtle). MEXICO: OAXACA: 8.0 km N. Pochutla on Hwy. 175. 16 June 1979. J. B. Iverson, P. Meylan, and D. Gicca. Verified by J. B. Iverson. Florida State Museum (UF 45984). Fresh DOR, 1125 hrs CST. Extends range of subspecies eastward ca. 130 km along Pacific coast and narrows hiatus in range between *R. p. incisa* and *R. p. pulcherrima* to less than 90 km (Ernst, 1980, Cat. Amer. Amph. Rept. 1-2; Smith and Smith, 1980, Synopsis of the herpetofauna of Mexico, Vol. VI. Guide to Mexican Turtles, John Johnson, North Bennington, Vermont).

Submitted by **JOHN B. IVERSON**, Department of Biology, Earlham College, Richmond, Indiana 47374. ●

SAURIA

HEMIDACTYLUS GARNOTI (Indo-Pacific Gecko). USA: FLORIDA: Collier Co: Naples. 4 March 1980. W. B. Hadley. Verified by J. C. Mitchell. U. S. Nat. Mus. Nat. Hist. (USNM Herp Field Number 112974). Specimen was found in a hospital; several others observed locally. New county record and first record for mainland of west coast Florida. This locality lies 40 km SE Sanibel Island record (McCoy, C. J. 1972. SSAR Herp. Review 4(1):23). Myers (1978. SSAR Herp. Review 9(3):107 and 1979. SSAR Herp. Review 10(3):102-103) and McCoy (1972, SSAR Herp. Review 4(1):23) review east coast localities.

Submitted by **JOSEPH C. MITCHELL**, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916 (mailing address: 1716 Rockwood Rd., Richmond, Virginia 23226) and **WILLIAM B. HADLEY**, 453 Ingraham Street, Naples, Florida 33940. ●

SERPENTES

CROTALUS SCUTULATUS SCUTULATUS (Mojave Rattlesnake). USA: TEXAS: Brewster Co: 33.6 km E Marathon on US Rt. 90. 8 August 1978. Fred Kraus and Gordon W. Schuett. UMMZ 169868. Extends range 34.6 km to the east (see Jacob, J.S. 1977. Southwest. Nat. 22(4):469-485.). The characters observable on the specimen (found DOR) conform with those of *C. s. scutulatus* as designated by Jacob (1977). The minimum number of scales between the supraoculars is two, the average width of the black tail bands is 2.6 scales, the average width of the white tail bands is 4.0 scales, the black band: white band ratio is 0.65.

Submitted by **FRED KRAUS** and **GORDON W. SCHUETT**, Department of Biology, University of Toledo, Toledo, Ohio 43606. ●

CROTALUS VIRIDIS VIRIDIS (Prairie Rattlesnake). USA: TEXAS: Swisher Co: on US Rt. 87, 3.2 km N St. Rt. 214 junction. 30 August 1979. Gordon W. Schuett and Fred Kraus. Collected DOR. UMMZ 169870. First record for Swisher County (Raun, G. and F. Gehlbach, 1972, Dallas Mus. Nat. Hist., Bull. no. 2, part 1).

Submitted by **GORDON W. SCHUETT** and **FRED KRAUS**, Department of Biology, University of Toledo, Toledo, Ohio 43606. ●

MASTICOPHIS FLAGELLUM TESTACEUS (Western Coachwhip). USA: TEXAS: Gray Co: 62.4 km W Oklahoma-Texas state line on US Rt. 40. 29 August 1979. Fred Kraus and Gordon W. Schuett. UMMZ 169867. First record for Gray County (Raun, G. and F. Gehlbach, 1972, Dallas Mus. Nat. Hist., Bull. no. 2, part 1).

Submitted by **FRED KRAUS** and **GORDON W. SCHUETT**, Department of Biology, University of Toledo, Toledo, Ohio 43606. ●

PITUOPHIS MELANOLEUCUS MELANOLEUCUS (Northern Pine Snake). USA: TENNESSEE: Shelby Co: *ca.* 2 km N Millington. 24 November 1979. Richard A. Smith. Identified by J. S. Jacob, verified by M. V. Plummer (Harding University). Memphis State University Museum of Zoology (MSUMZ A1579). Partly digested pine snake removed from stomach of road-killed, adult female coyote (*Canis latrans*). First record for county, third locality in state west of Tennessee River. Extends range *ca.* 120 km SW of nearest known locality (Henderson County). The exact locality for this specimen is in question considering its source, but it apparently came from the north-central Shelby County area since digestion in wild canids may occur in 6 hours or less (Mech, D. L. 1970. The wolf: the ecology and behavior of an endangered species, Amer. Mus. Nat. Hist., The Nat. Hist. Press, Garden City, NJ) and female coyotes have a home range of *ca.* 16 km² (Berg, W. E. and R. A. Chesness. 1978. Ecology of coyotes in northern Minnesota. Pages 228-247 in M. Bekoff (Ed.), Coyotes: biology, behavior, and management. Academic Press, New York).

Submitted by **JAMES S. JACOB** and **RICHARD A. SMITH**, Ecological Research Center, Department of Biology, Memphis State University, Memphis, Tennessee 38152. ●

REGINA SEPTEMVITTATA (Queen Snake). USA: ARKANSAS: Independence Co: Salado Creek, 3.5 km N. Alonzo, vic Camp Tahkodah; July 1969; J. Pryor, Identified by M. V. Plummer. Harding University Herpetological Collection (HUHC 896-897). Faulkner Co: North Cadron Creek at Hwy 65 bridge; 10 May 1979; K. Smith and M. Calloway, Identified by A. Johnson, Verified by M. V. Plummer. Harding Univ. Herpetological Collection (HUHC 2103). Eastward extension of ca. 130 km and northward extension of ca. 200 km along the fall line of the range of the relictual population in the Interior Highlands (Conant, 1960, Proc. Acad. Nat. Sci., Philadelphia 112:25-40).

Submitted by **MICHAEL V. PLUMMER**, Department of Biology, Harding University, Searcy, Arkansas 72143. ●

SISTRURUS CATENATUS EDWARDSI (Desert Massasauga). USA: TEXAS: Ward Co: 9.6 km N Grandfalls on Texas Rt. 18. 30 August 1979. Gordon W. Schuett and Fred Kraus. Collected DOR. UMMZ 169869. First record for Ward County (Raun, G. and F. Gehlbach, 1972, Dallas Mus. Nat. Hist., Bull. no. 2, part 1).

Submitted by **GORDON W. SCHUETT** and **FRED KRAUS**, Department of Biology, University of Toledo, Toledo, Ohio 43606. ●

DISTRIBUTION AND STATUS OF *VARANUS SALVATOR* IN INDIA AND SRI LANKA

INTRODUCTION

Based on visits to the present and former habitats of *Varanus salvator*, we find that the last major populations of this region occur in Sri Lanka and the Andaman and Nicobar Islands. The only two breeding populations left on the Indian mainland are in the mangroves of Bhitar Kanika Sanctuary, Orissa (an important saltwater crocodile and Ridley sea turtle area), and in the mangroves of the Sunderbans of West Bengal and Bangladesh.

Loss of mangrove habitat to farming, timber and firewood interests have severely reduced its range and the existing populations (except Sri Lanka) are threatened by over-hunting for meat, fat and skin. The skins have traditionally been used to make drums in some areas (Northeast India), but their large size has also served to popularize them in the international skin trade. The meat is readily eaten by many people in Bengal and Andamans, where dogs are employed to run the lizards down. The semi-developed eggs in gravid females are considered a delicacy (the consistency and flavor of an expensive liver paté). The meat is tough, but as palatable as that of other monitors, and the fat is considered of "medicinal" value to be consumed for strength and vigor and to be used topically for muscle and joint pains. In some parts of India, the brightly marked baby monitors ("bis cobra") are considered very venomous, and in Sri Lanka it is believed that water monitor flesh is poisonous. The Singhalese also believe that a deadly poison can be obtained by hanging a dead water monitor up by the tail and collecting the dripping saliva.

FORMER DISTRIBUTION AND ABUNDANCE

There is very little in the literature to indicate the former abundance of *Varanus salvator* in India. To quote M. A. Smith: "Not found in the Peninsula of India except in the extreme northeast, East Bengal and the Eastern Himalayas (up to 6,000 feet); said to be common in the Sunderbans. . . ." It is possible that they were found in the extensive mangroves that once clothed the Malabar coast (now Kerala State) in the extreme southwest. Though there is no direct evidence, it is also possible that they once inhabited several mangrove areas on the east coast (formerly *C. porosus* habitat) namely the deltas of the Krishna and Godavari Rivers in Andhra Pradesh and Pechivaram, Coleroon and Muthupet in Tamil Nadu. Several authors (including M. A. Smith (1973) and E. H. Taylor (1963)) mistakenly reported it from northern Australia (*V. mertensi* is the "water monitor" there). It is hard to confirm whether the rest of this lizard's reported distribution is accurate. Its current occurrence in Burma, Thailand and parts of Malaysia and the "Indochinese" mainland is confirmed, (Smith, 1973; Taylor, 1963) but little else. *Varanus salvator* has a considerably smaller range than once supposed. Its existence in the eastern Himalayas and status in Bangladesh have yet to be investigated.

PRESENT DISTRIBUTION AND ABUNDANCE

On the Indian mainland, the water monitor is found in the two mentioned mangrove habitats in the northeast. The only two substantial populations in the Indian region are in the Bay Islands and Sri Lanka.

1. The deltas of the Mahanadi and Brahmani Rivers in Orissa form a network of creeks and mangrove island totalling about 200 sq. kms. Half of this was designated a Sanctuary in 1976 for the saltwater crocodile, *C. porosus* (total population of possibly 200), and the outlaying sandy islands for the Ridley turtle (over 100,000 nesting *Lepidochelys olivacea* were marked on Wheeler Island rookery in February 1976). Water monitors are evident throughout the area, including the sea turtle nesting beaches, but do not appear to be common. The mangrove area is being harvested for firewood under a Forest Department rotating crop system, but it is also being illegally hacked away by the farmers whose holdings closely surround the sanctuary. Most of the monitors appear very wary, are secretive and bolt upon sighting a human. On the other hand, at the Forest Rest House and Crocodile Rehabilitation Center in Dangmal, several water monitors have reportedly become regular visitors for handouts of fish. The dense mangrove cover and abundance of small animal life provide the water monitor with an excellent refuge. The monitor's role in predation upon an even more endangered species, the saltwater crocodile, should be examined and adequate check on illegal deforestation (through policing, education and social forestry) implemented.

2. West Bengal has likewise protected a large area of the Sunderbans mangrove in the Project Tiger Reserve. There exists here greater faunal diversity than at Bhitar Kanika. Human activity and pressure in the area has reduced both the crocodile and water monitor to remnants of their former abundance. A survey study of the recuperation rate of these two vital predator/scavenger components of the mangrove community should be made. Adjacent areas in Bangladesh are being protected, and studied from a conservation standpoint.

3. Andaman and Nicobar Islands - The species is apparently distributed throughout the group, including most islands close offshore of the main group. These islands are characterized by dense forests of several categories with numerous mangrove-bordered creeks and bays. The water monitor is noticeably more common and less wary the further one gets away from the main settlements. We observed wary juveniles but no adults in the vicinity of Bamboo Flat (across the bay from the capital town of Port Blair), whereas we saw several adults close to the jetty and settlements around Aerial Bay in North Andaman. The Interview Island monitors are noticably heavier and larger than those seen on other parts of the Islands and certainly more vulnerable to attack by dogs (many were caught in our presence). It appears that the monitor populations of the Jarawa Reserve (a 450 sq. km. area of the western half of Middle and part of South Andaman inhabited by Jarawa negritos and off-limits to everyone else), and parts of Little Andaman and the southern islands of the Nicobars in particular are still intact and close to original in composition.

The recent placing of all monitor lizards on Schedule 1 of the Wildlife Protection Act by the Government of India will afford this "dragon" badly needed protection. As usual, proof of this law lies in its implementation. In the Andamans, nothing short of banning hunting dogs will prevent the settlers from using the monitor as a meat and fat source. In June 1978, thirty monitors killed for skin and fat were observed in North Andaman by a visiting zoologist (Choudhury, pers. comm.).

4. Sri Lanka - It was with wonder that we encountered the water monitors of Sri Lanka. They are abundant and commonly seen scavenging in garbage or swimming in streams, close to people washing clothes or bathing.

During our crocodile survey throughout the Island in September - November 1977, we made notes on the distribution of the water monitor and have compared these with the available scientific literature to formulate the following rough distribution.

1. Colombo to Hambantota (coastal south and southwestern Sri Lanka) - common.
2. Yala to Pottuvil (coastal southeastern Sri Lanka) - absent.
3. Pottuvil to Trincomalee (eastern coast) - uncommon, confined to suitable areas.
4. Trincomalee to Jaffna and to Puttalam (both coastlines of Northern Province) - apparently absent.



Fig. 2. *V. salvator* on Interview Islands in the Andamans.

5. Puttalam to Colombo (coastline of Northwestern Province) - uncommon; increasingly common toward Colombo.
6. Inland - fairly common at Polannaruwa; prior to recent drought commonly seen in Anuradhapura; seen along Mahaweli Ganga in Kandy; uncommon at Kurunegla, Kegalla and Ratnapura.

The water monitor is rarely killed in Sri Lanka. Although many people, particularly the Tamils, eat the common monitor (*Varanus bengalensis*), water monitor meat is considered poisonous and its saliva and tongue venomous. This has allowed the water monitor to thrive and grow to great proportions (2.5 m in length and 18 kgs. in weight for a large male).

REFERENCES

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ROMULUS AND ZAI WHITAKER
Madras Snake Park Trust
Madras 600 022



Fig. 1. *V. salvator* on Interview Islands in the Andamans.



Fig. 3. Juvenile *V. salvator* in the Andamans (July 1976).



Fig. 4. Captive bred *V. salvator* at Madras Snake Park (March 1978), origin Orissa, northeast India.

CURRENT LITERATURE

The Current Literature section was not received in time for inclusion in this issue. The next issue will carry an extra group of titles.

REGIONAL SOCIETY NEWS

ST. LOUIS HERPETOLOGICAL SOCIETY

The St. Louis Herpetological Society, founded in 1974, is a group of amateur and professional herpetologists dedicated to conservation and education in all areas of herpetology. To attain this goal, the Society has published a booklet on reptile and amphibian care (to be revised this summer) and a checklist of Missouri reptiles and amphibians; it has printed a bumper sticker which asks protection for reptiles and amphibians and a poster entitled "Please Don't Kill That Snake." The SLHS also prints the JOURNAL, a publication which presents articles by its members, articles from other publications, and a variety of information of interest to herpetologists. The society also maintains a publication exchange program with approximately 25 different herpetological societies as an excellent additional source of information.

The SLHS sponsors displays at the local Museum of Science and Natural History and funds, in part, the tuatara breeding project at the St. Louis Zoo Herpetarium. It also contributes to organizations involved in various aspects of conservation, such as the Missouri Prairie Foundation. The society maintains communication with the St. Louis Zoo, the Museum of Science and Natural History, the local universities and colleges, and local humane and animal protection organizations for referrals of problems and information. The SLHS participates in regional and area symposiums, conferences and fairs, displaying and providing information and literature to the public. The society also has a speaker bureau which is available for educational presentations to groups of all ages. The SLHS has spoken to Scout groups, adult church groups and at summer library programs, to name a few.

The SLHS actively investigates and voices its disapproval of inhumane, anti-ecological, and anti-conservational practices, such as magazine advertisements which depict animal mistreatment, rattlesnake hunts, violations of the Endangered Species Act, improper care procedures at local pet shops, etc.

The SLHS membership is open to all interested persons. The society has members throughout the U.S. and in Canada and Europe. Annual dues are: Individual -$7.00; Family - $10.00; Institutional and Overseas - $15.00. The JOURNAL is published five times per year and is free with membership. For more information contact the society at P.O. Box 9216, St. Louis, MO 63117. ●

ESHL MEETING

October 1980 meeting of the Eastern Seaboard Herpetological League.
Sponsored by the Philadelphia Herpetological Society

DATE: Saturday, October 25, 1980
TIME: Noon to about 6:00 PM
PLACE: Philadelphia Zoological Gardens
34th and Girard Avenue
Education and Administration Bldg.
Philadelphia, PA

NOTE: All members of ESHL constituent organizations are invited to attend this meeting. There is no registration fee. ●

WISCONSIN HERPETOLOGICAL SOCIETY

The Wisconsin Herpetological Society is a non-profit organization which was formed to encourage conservation of amphibians and reptiles, to promote the accumulation and dissemination of knowledge concerning amphibians and reptiles, and to promote cooperation and understanding among amateur and professional herpetologists and other institutions working to further knowledge and conservation.

Regular meetings are held on the third Wednesday of the odd months at the Milwaukee Public Museum. Membership is open to anyone with an interest in reptiles and amphibians. As a member you receive the bi-monthly newsletter and may attend regular and special meetings.

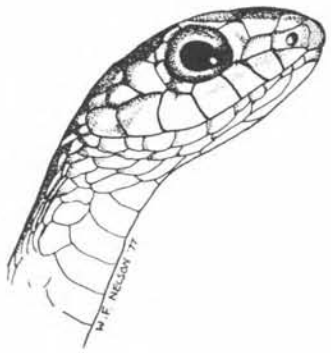
For membership information write: Membership WHS, Jeff Riedi, 8823 W. Becher St., West Allis, Wis. 53227

society for the study of amphibians and reptiles

The Society for the Study of Amphibians and Reptiles is a non-profit, international organization established to advance the study of amphibians and reptiles. Although begun in 1958 as a regional society, the SSAR has rapidly gained a world-wide membership. Today it is recognized as having the most diverse society-sponsored program of services and publications for students of herpetology. Membership is open to all persons interested in learning about amphibians and reptiles.



activities



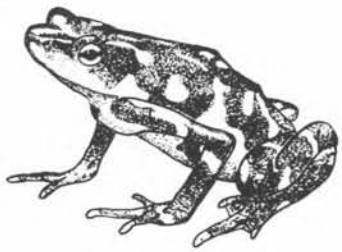
An annual meeting is held each summer on a university campus or at a biological station in the United States. The Society especially wishes to attract students to its meetings by providing inexpensive and informal facilities. In addition to the papers given by members at these meetings, symposia or other invited speakers are usually planned which allow for detailed discussions of important areas of contemporary study. Workshops for regional society representatives have been organized for the purpose of exploring common problems and sharing new ideas. Live animal, photographic, art, and other exhibits are organized, as well as field trips.

The Society makes a concerted effort to involve a diverse segment of its membership in Committee activities designed to further our knowledge of amphibians and reptiles and manage the affairs of the Society. Committees include: Publications, Nominating, Student Prize, Systematic Resources, Common and Scientific Names, Current Literature, Regional Society Liaison, Conservation, Public Affairs, Editorial, Translations, and Annual Meeting.

publications

SSAR sponsors one of the most diversified series of publications of any scientific society. Each series is described on the reverse of this page. Back issues of most publications are available; a detailed price-list can be obtained simply by checking the appropriate box on the membership application.

membership privileges



All persons with an interest in amphibians and reptiles are welcome to become members of SSAR. Members vote on society matters, attend meetings, and participate in other Society activities. Each year members receive the following publications: Journal of Herpetology (4 issues, totaling about 400 pages), Facsimile Reprints in Herpetology (3-4 issues, about 200 pages), Herpetological Circulars (1-2 issues, about 50 pages), and Herpetological Review (4 issues, about 130 pages).

In addition, SSAR members receive a substantial discount on all book-length facsimile reprints issued during the year. Members may also place standing orders for accounts in the SSAR Catalogue of American Amphibians and Reptiles. Those persons electing the higher membership categories (Sustaining and Contributing members) receive the same publications and services, but provide additional financial support which allows the Society to expand and improve its programs more rapidly than would otherwise be possible.

membership/subscription

Please mark those boxes opposite the items you wish to subscribe to or order, fill in your name and address, and return to:

Dr. Henri C. Seibert
Department of Zoology
Ohio University
Athens, Ohio 45701

Your name and address:

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Payment should be in U.S. Funds.
Make checks payable to "SSAR"; receipt sent on request only.

●INDIVIDUALS:		
Student member	$ 15.00	☐
Regular member	18.00	☐
Sustaining member	25.00	☐
Contributing member	30.00	☐
Catalogue of American Amphibians and Reptiles, standing order	30.00	☐
●INSTITUTIONAL:		
Publications set: Journal, Facsimiles (booklet series), Circulars, and Herp Review	25.00	☐
Catalogue of American Amphibians and Reptiles, standing order	12.00	☐

TOTAL ENCLOSED $_____

Please check here if you want a list of all SSAR publications available for purchase. ☐

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HERPETOLOGICAL REVIEW EDITORIAL POLICY

The following statement-of-purpose appeared in the Introduction to the first issue of **Herpetological Review** in 1967 (Corson Hirschfeld, Editor):

> "**Herpetological Review** incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the **Review** will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to all persons in herpetology and we hope all members will find it informative and entertaining."

Herpetological Review still remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the **Journal of Herpetology**—see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Manuscripts submitted **must** be typed, double-spaced, on 8½ X 11 paper, and should be sent in duplicate. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles may also be submitted. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of the unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

Reprints of contributions cannot be supplied. Contributors may reproduce up to 200 copies of pages containing their own articles for private distribution only. No reproduction for sale purposes is permitted. **Herpetological Review** will accept commercial advertising (except live animal ads). Rates and copy information are available from Barbara Paschke, **HR** Associate Editor, 731 Tennessee Street, Lawrence, Kansas 66044 USA.

SSAR CATALOG OF AMERICAN AMPHIBIANS AND REPTILES

THE CATALOG: Imprinted binder, taxonomic tabs, accounts 1-220	
Individuals	(*) $57.00
Institutions	(*) $85.00
IMPRINTED POST BINDER	(*) $ 8.00
SYSTEMATIC TABS	$ 1.50
CATALOG ACCOUNTS 221-245	
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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

Membership is open to anyone interested in amphibians and reptiles. Members have voting privileges in the Society. They receive the **Journal of Herpetology** (four issues per year), **Herpetological Review** (four issues per year), **Herpetological Circulars**, and several **Facsimile Reprints in Herpetology**. Members may purchase other Society publications at reduced rates.

ANNUAL DUES

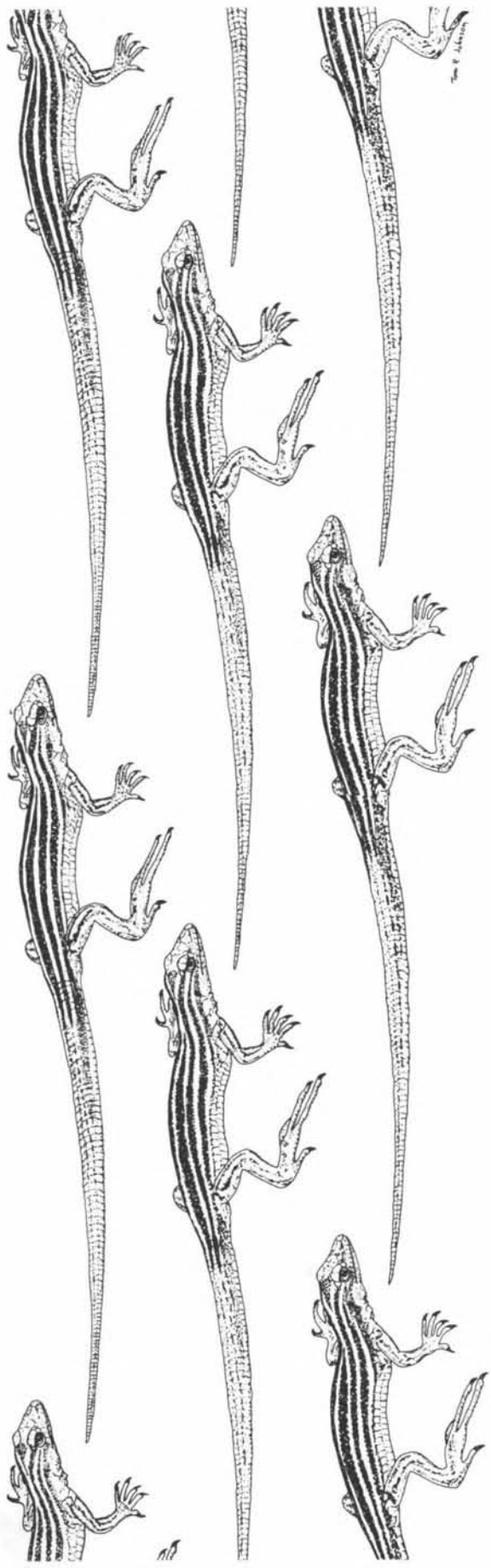
Student member	$12.00
Regular member	$15.00
Sustaining member	$20.00
Contributing member	$25.00
Institutional	$25.00

Individuals are encouraged to join at the higher membership categories. Money from such support substantially helps promote the publications and services of the SSAR. For information about SSAR membership, write to:

Henri C. Seibert
SSAR Treasurer
Department of Zoology
Ohio University
Athens, Ohio 45701

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Volume 11 June 1980 Number 2

Contents

SSAR ANNUAL MEETING ANNOUNCEMENT 26

SSAR BUSINESS

Regional Societies Conference 26

Note From Secretary 26

FEATURE ARTICLES

Herpetology in Milwaukee, by M. A. Nickerson, *et al.* 27

Aldrin persists in yellow mud turtle, by E. L. Flickinger and B. M. Mulhern 29

An albino eastern box turtle, *Terrapene c. carolina*, from North Carolina, by R. G. Arndt 30

A hibernating eastern hognose snake, *Heterodon platyrhinos*, by R. G. Arndt 30

LEGISLATIVE ALERT

Letter from Hugh Quinn to Representative Richmond 28

REGIONAL SOCIETY NEWS

Regional herpetological society list—update 29

HERPETOLOGICAL HUSBANDRY

Observations on the reproduction of the common anaconda, *Eunectes murinus*, at the New York Zoological Park, by W. F. Holstrum, Jr. 32

A longevity record for *Ctenosaura pectinata* (Reptilia: Iguanidae), by W. H. Clark, *et al.* 33

Captive propagation in the lancehead rattlesnake, *Crotalus polystictus*, by R. H. Hubbard 33

NEWSNOTES 34

GEOGRAPHIC DISTRIBUTION

New records 36

Geographic distribution of two color mutants of the corn snake, *Elaphe guttata guttata*, by E. Bechtel 39

Locality records of *Rhinocheilus lecontei* in the United States and Mexico, by P. A. Medica 42

Enyaliosaurus quinquecarinatus (Gray) and *Leptodeira nigrofasciata* (Günther) in El Salvador, by H. Hidalgo 42

CURRENT LITERATURE 45

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Joint Annual Meeting SSAR/HL
University of Wisconsin-Milwaukee
Milwaukee, Wisconsin
6-10 August 1980

MEETING SITE

Registration, presentation of papers, symposia and special meetings will be on the campus of the University of Wisconsin-Milwaukee. Meeting schedules will be based on Central Daylight Savings Time.

REGISTRATION

Pre-registration at reduced fees can be made until 20 June. Forms will be mailed to SSAR and HL members. Regular registration will be 6 August in the lobby of UW-M's Sandburg Towers Dormitory. Beginning 7 August registration will be in the Student Union.

FEES

Pre-registration (until 20 June)
Regular $17.50
Student $10.00

Registration
Regular $20.00
Student $15.00

TRANSPORTATION

Airline reservations should be made to Milwaukee International Airport (Mitchell Field). Milwaukee is a port of entry for the U.S. Foreign members who plan to attend may find it more convenient to pass through customs there than in Chicago. The airport is ten miles from the UW-M campus. Special transportation will be provided on 6 and 7 August (call 963-4825) and ask for SSAR/HL information desk. For drivers, Milwaukee may be reached via I-94 (see map). Parking is available at the dormitory (residents $2/day) and Student Union (pay).

ACCOMMODATIONS

On campus, rooms at Sandburg Towers will be available at the following daily rates:

Single $10.00
Double $8.00

Linen, towels and maid service are provided. Bathroom facilities will be shared between adjacent rooms. Laundry facilities are available, but there are no refrigerator or cooking facilities. Sandburg Towers has a Pizza Hut restaurant and general store-deli. Dormitory rooms will be available from 1300 h, 5 and 6 August. Please send room reservations by 20 June to guarantee space. If you reserve space and your plans change, please notify UW-M Sandburg Towers (963-4068), for refund of deposit, before 30 July to cancel your reservations. The nearest hotel and motel accommodations are about 3 miles from campus. A list of area hotels and motels is available from SSAR/HL Information Center, Milwaukee Public Museum, 800 W. Wells, Milwaukee, Wisconsin 53233 (414-278-2734).

ACTIVITIES

Depending upon interest, several field trips and other excursions may be available. These include visits to Mitchell Park Conservatory, Boerner Botanical Gardens, Schlitz Audubon Center, breweries, etc. Individuals participating in organized field trips will need to obtain collecting permits if they desire to collect frogs or turtles. They may apply to:

Scientific Collecting Permits
c/o Jim McNelly
Wisconsin Dept. of Natural Resources
Box 13248
Milwaukee, Wisconsin 53213

A narrative proposal is required! Other herps may be taken without permits unless they are listed as endangered or threatened. Researchers wishing permits for endangered or threatened species should send proposals to Jim Hale, Office of Endangered Species, Box 7921, Madison, Wisconsin 53707.

SYMPOSIA

Three symposia are planned. The arrangements for and contributions to these symposia are being handled by the symposia convenors. If you wish to participate in a symposium or would like further information, contact:

Bern W. Tryon, Chairman
SSAR Symposium on the Reproductive Biology and Conservation of Crocodilians
Dept. of Herpetology
Fort Worth Zoological Park
Fort Worth, Texas 76110

John C. Murphy, Chairman
4th Annual Regional Herpetological Societies Conference - Endangered Herptile Biology
201 Peerless Drive
Plainfield, Illinois 60544

Richard Seigel, Chairman
Fitchian Herpetology: The Descriptive Approach: A Symposium in Honor of Henry S. Fitch
Museum of Natural History
University of Kansas
Lawrence, Kansas 66045

For additional information, please call or contact:

Herpetological Information Center
Milwaukee Public Museum
8th & Wells St.
Milwaukee, WI 53233
414-278-2734

SSAR BUSINESS

REGIONAL SOCIETIES CONFERENCE

The 4th Annual Regional Herpetological Societies Conference will be held in conjunction with the SSAR/HL meeting in Milwaukee, on the University of Wisconsin campus, 10 August 1980. The meeting will be a symposium on the "Current Research and Status of Endangered North American Herptiles." Time (Tentative) 10 AM to 4:30 PM. There is no registration fee; all are welcome. ●

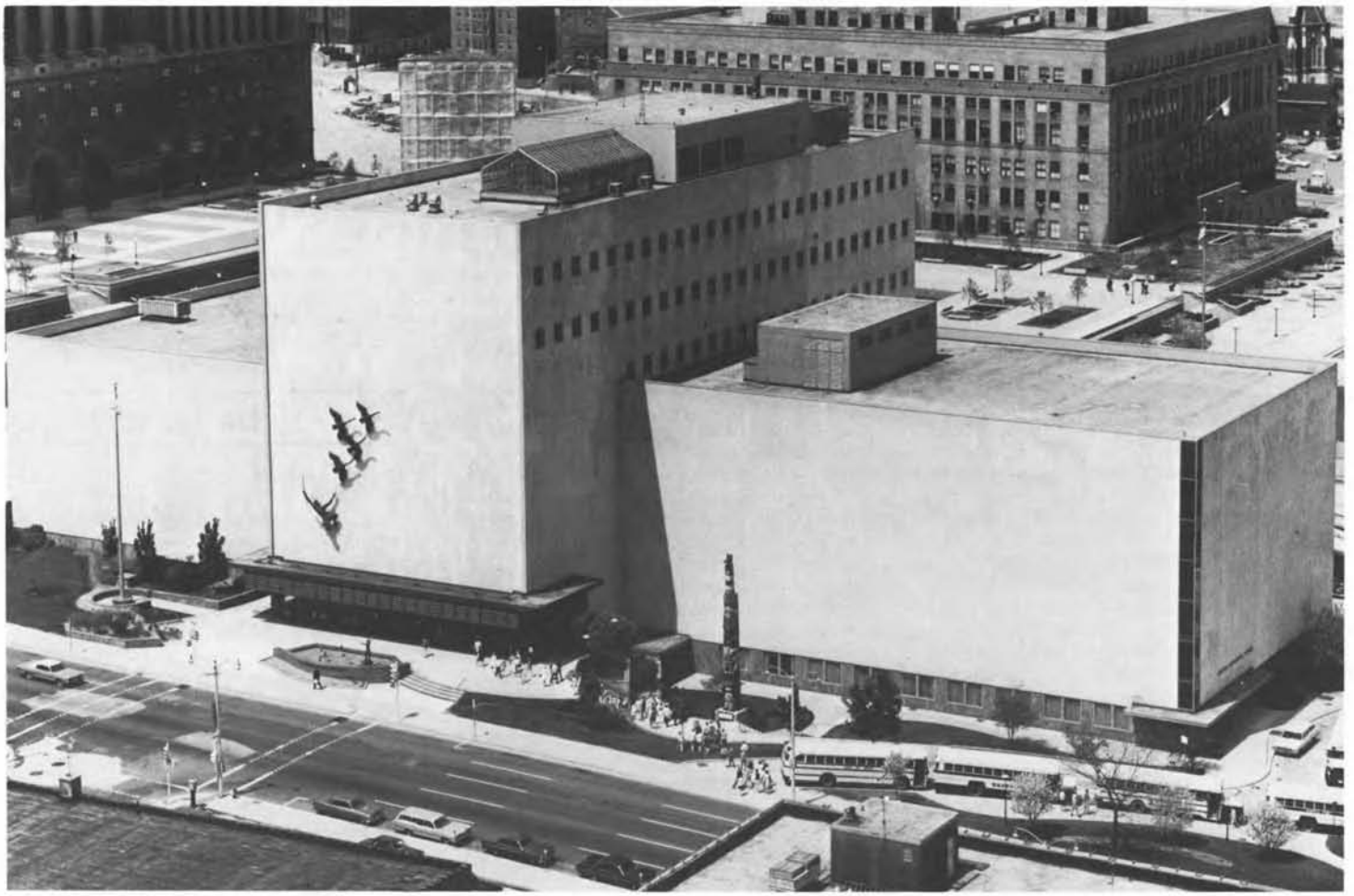
SECRETARY'S NOTE TO MEMBERSHIP

On 17 March, I regretfully resigned as SSAR Secretary. Joseph T. Collins agreed to serve as interim secretary and was appointed by President Bob Webb. This decision was prompted by overwhelming, and I might say unforeseen, commitments within the Association of Systematics Collections. Attempting to discharge the responsibilities of both positions has proven detrimental to both.

I value my relationship with SSAR highly, and I deeply regret having to take this action in the middle of my term, and understand that the decision will cause a number of problems in and of itself. However, I believe that in the long-run it is the right decision to make if the Society is to have more than just a figure-head in this critical position. I hope I may be of future service to SSAR, time permitting.

STEPHEN R. EDWARDS
Executive Director, ASC ●

HERPETOLOGY IN MILWAUKEE



The University of Wisconsin-Milwaukee is one of the country's major urban universities, offering the resources of a large university as well as Wisconsin's major metropolitan area to its students, including doctoral and pre-college programs, liberal arts and professional schools, sophisticated research programs and outreach activities. UWM was formed in 1956 by the merger of Wisconsin State College, Milwaukee, and the University of Wisconsin Extension Center in Milwaukee. The University traces its origins, however, to 1885 and the opening of Milwaukee State Normal School, which became Milwaukee State Teachers College in 1927, then Wisconsin State College, Milwaukee, in 1951.

The University is part of the University of Wisconsin System, which includes 13 universities, 14 two-year campuses, and the statewide UW-Extension. As the urban campus of the UW System, UWM is oriented to serve the needs of a metropolitan area, as well as to achieve a leading national and international role in selected areas of research and study. The schools and colleges at UWM include the School of Allied Health Professions, School of Architecture and Urban Planning, School of Business Administration, School of Education, College of Engineering and Applied Science, School of Fine Arts, Graduate School, College of Letters and Science, School of Library Science, School of Nursing, and School of Social Welfare. UWM offers 60 baccalaureate majors, 43 master's programs, and 15 doctoral programs. Another unit, the Division of Urban Outreach, jointly sponsored by UWM and UW-Extension, extends the instructional, research, and public service of UWM and Extension to persons not traditionally involved in campus-based learning.

The University serves more than 24,000 students on its 90-acre campus, located in a handsome residential neighborhood near Lake Michigan, and in fiscal 1978, was among the top 100 public doctorate-granting institutions in the nation in research and development expenditures.

The University of Wisconsin-Milwaukee provides facilities for herpetological research in the Dept. of Zoology and the UWM Field Station. The station has available over 1000 acres of preserve located 30 miles north of Milwaukee and includes S.E. Wisconsin's largest protected tamarack-cedar bog. Research at the station has included distribution and population studies of Wisconsin turtles, salamanders and frogs. The facilities are available for use by any investigator through arrangements with the Director. Cooperative arrangements with the other 27 campuses of University of Wisconsin Systems provide additional opportunities for research throughout the state.

Three faculty members are directly involved in herpetological research. Dr. James R. Coggins, an ecological parasitologist, is involved in the systematics of the parasite genus *Phyllodistomum* (found as a bladder parasite of some salamanders) and is currently supervising a parasitological survey of Wisconsin amphibians. Sampling so far has included all native Wisconsin salamanders and many frogs. Dr. Albert Williams continues a comparative study of the reproductive system of salamanders. Specifically investigated is the sperm transport system in the male glandular production of spermatophores, and the effect of cloacal gland secretions on sperm maturation and activity. Richard Sajdak's graduate research has included a population study of *Necturus* utilizing radiotracking techniques and distributional surveys of Wisconsin amphibians. Dr. John E. Minnich has been conducting studies on several aspects of water, energy, electrolyte and nitrogen metabolism in vertebrates, especially reptiles. His approach has been primarily ecophysiological, but has also included endocrinological and even cellular studies. Recent herpetological studies (many in collaboration with former graduate students) include the following water and electrolyte fluxes in free-living desert and gopher tortoises, endocrine control of sodium fluxes in mudpuppy salamanders and effects of calcitonin on kidney and salt gland function in desert iguanas.

Currently Dr. Minnich is preparing to investigate seasonal variations in water and energy budgets of free-living gopher tortoises in Florida, using the doubly-labeled water method.

Three graduate students are currently studying under Dr. Minnich's supervision, two in herpetological areas. Scott Stegbauer recently completed his M.S. dissertation on effects of osmoregulatory hormones on the ultrastructure of the lizard cloaca. He and Dr. Minnich are also conducting similiar studies on the nasal salt gland of lizards. Drew Hildebrandt is conducting studies on the effects of hydration state, salinity and dietary nitrogen intake on renal clearance of ammonia, urea and urate in several species of turtles (painted turtle, diamondback terrapin, box turtle and desert tortoise).

The collections of the Milwaukee Public Museum trace their origins to the efforts of local individual citizens. In the 1850's Peter Englemann assembled natural hisotry collections at the German English Academy where he was a schoolmaster. Originally these collections were used as adjuncts to classroom study. The collections continued to grow, and in 1857 Englemann helped form *Der Naturhistorische Verein von Wisconsin* (the Natural History Society of Wisconsin) which assumed curatorial responsibility for the collections. This society became concerned with making collections available to the general public and offered them to the City of Milwaukee with the provision that it establish and maintain a free museum of natural history. the state legislature passed enabling legislation in 1882, and in 1884 the Milwaukee Public Museum opened its doors to the public.

The new Museum grew rapidly. During its first fourteen years it was housed in a section of the Industrial Exposition Building. Additions to the collections resulted in the city providing more space by opening a joint library-museum building in 1898 with 47,000 square feet allotted to the Museum. In 1905 the museum acquired an additional dimension when "history" was added to its "natural history" designation. Continued collection growth resulted in temporary storage space in various adjoining buildings and by the mid 1950's mandated new quarters for the Museum.

These new quarters were provided in 1963 with completion in downtown Milwaukee of the present seven story building which has special air filtration and conditioning systems to minimize specimen deterioration. The ground floor contains the Education Division, a small animal zoo, trading post, classrooms and the cafeteria. The next three floors together with a small ground floor exhibit area provide a total of 165,000 square feet of exhibit space, and the last three floors have a total of 120,000 square feet for collections, laboratories, and offices. Approximately 33,300 square feet in the basement are used for storage of collections not on display.

With the continued growth of the museum collections and the simultaneous growth of the Milwaukee metropolitan area the museum began to serve not only the educational, cultural, and scientific needs of citizens of the city of Milwaukee but also those of nearby communities. This increased constituency was recognized in 1977 when the County of Milwaukee purchased the Museum from the city and assumed responsibility for its operation. The Museum is one of the half dozen largest and best known natural and human history museums in the United States. Because of its size and the scope and quality of its programs it serves not only residents of Milwaukee County but also those of virtually the entire state of Wisconsin and much of the upper Midwest.

Since 1971 the museum has been reorganized under the leadership of the Director, Dr. Kenneth Starr. Systematic collections are now housed in four sections and emphasize Wisconsin, central United States, Latin America, and other areas of research interest to past and present curators.

Vertebrate Zoology houses MPM's largest natural history collections, approximately 1,250,000 specimens, some dating from the 1840's. The herpetological collection has 18,750 catalogued specimens, and geographic regions featured include Wisconsin, central U.S., Belize, and Amazonian Peru. The herpetological staff includes Dr. Max A. Nickerson, Curator and Robert W. Henderson. Mr. Henderson's current research includes convergent behavior in attenuate-snouted tree snakes, the ecology of milk snakes, and a multi-faceted study of vine snake behavior, ecology and morphology in collaboration with Mary H. Binder. Laboratory studies are being conducted along with field work on *Uromacer* in the Dominican Republic. Nickerson is continuing ecological studies of cottonmouths, northern water snakes, and map turtles. He is also assisting Dr. J. M. Fujimoto and S. C. Roerig with studies of the hepatic enzyme system for reducing naloxone to 6 α and 6 B-naloxol in vertebrates and continuing some hemoglobin studies with Dr. F. Taketa at the Medical College of Wisconsin. Other herpetologically involved staff include Dr. Teresa Noeske investigating the effect of temperature regimes on *Anolis* reproduction and fattening and Dr. Merlin Tuttle studying Neotropical bat interactions with anurans in Barro Colorado.

Milwaukee is justifiably proud of its large modern zoo. The *Milwaukee County Zoo's* Reptile and Aquarium Building opened in 1968 under the supervision of Dave Zucconi, now Director of the Tulsa Zoo. The building displays over 100 species of reptiles and amphibians with a number of additional species not on display. The collection is maintained by two keepers under the direction of Sherman Ketcham, Curator. Keepers Cliff Van Beck and Richard Sajdak are continuing graduate studies at UWM.

Staff are involved in research projects with many institutions including the Medical College of Wisconsin, University of Illinois-Urbana and the Milwaukee Public Museum. The Zoo cooperates with the Milwaukee Public Schools, Wisconsin Department of Natural Resources and other groups in providing animals and displays for educational purposes.

Recently some reptilian cages have been renovated into more naturalistic displays using gunite and other materials. The new cage designs afford an increased number of species per display and an improvement in animal husbandry. Plans are under way to remodel the remaining cages. Future plans include better environmental controls and increased display area in the building.

Under the leadership of Milwaukee's new zoo director, Dr. Gilbert K. Boese, the reptile section anticipates increased emphasis on research and reproduction. A special commitment will promote the husbandry and propagation of endangered species.

Prepared by:
MAX A. NICKERSON
AL WILLIAMS
SHERMAN KETCHAM
and members of the local committee ●

Legislative Alert

20 February 1980
The Honorable Fred Richmond
The House of Representatives
U. S. Congress
Longworth House Office Building
Washington, D. C. 20515

Dear Mr. Richmond:

The Society for the Study of Amphibians and Reptiles (SSAR) is an international organization with over 1,800 members. It expresses concern in regard to House Bill H. R. 4805, the "Research Modernization Act."

The bill seems to confer a blanket condemnation on the use of all captive live animals, regardless of the purpose of the research. This could then affect herpetological research involving behavioral studies, breeding experiments, etc. I don't believe the bill was intended to deal with the above, so perhaps a definition of the types of research to which this bill pertains should be outlined. The definition of animal also needs clarification. Does it include *Drosphila* and bacteria as well as mammals?

It would be dangerous to consider that the results of experiments demonstrated by models would be the same as those results on living systems. Therefore, predictions derived from experimentation with models could not be certainties unless tested on living systems.

Section 6b of the act concerning duplication of research is vague. Repeatability is a basic tenet of the scientific method for validating conclusions drawn from an experiment. Thus, duplication of experiments would seem a very proper activity of scientists. This section could preclude funding for any study which would use live animals to test conclusions derived from models.

Ordering agencies to direct 30-50% of all research appropriations to developing alternative research methods (Section 10) represents a tremendous and sudden shift in research direction. Perhaps it would be well advised to enter this program cautiously and gradually, if at all.

In summary, research models have their place in certain types of research, but not in others. To suddenly plunge into extensive model use by financially obligating research-

ers to participate in such a program may lessen research productivity and cast doubt on the practical application of experimental results. If research involving models is highly favored, it is feared that research which cannot involve the use of models might receive secondary consideration in funding.

Sincerely,

Hugh Quinn, Chairperson
SSAR Legislative Alert Committee ●

Regional Society News

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ALDRIN PERSISTS IN YELLOW MUD TURTLE

On the evening of 8 June 1974, a female yellow mud turtle (*Kinosternon flavescens*) (weight 110.1 g) in a state of ataxia (swimming on its side in circles) was collected in a flooded rice field near Chocolate Bayou, Brazoria County, Texas. The whole carcass was frozen and stored until analysis at Patuxent Wildl. Res. Cntr. in October 1977. Extraction, sample cleanup, and separation of organochlorine pesticides and polychlorinated biphenyls (PCB's) were described by Prouty, *et al.* (1977). The turtle contained 4 ppm aldrin, 47 ppm dieldrin, 1.3 ppm endrin, and 0.3 ppm toxaphene (all on a wet weight basis). No PCB residues were detected. The turtle was apparently suffering from insecticide poisoning. The rice field in which it was found had been planted with seed treated with aldrin at 113g/45kg (4 oz/100 lb.) at 45.4kg/0.4 ha (100 lb/A) on 9 May and had received an application of toxaphene on 1 June.

Aldrin is metabolized rapidly to dieldrin in warm blooded animals (Brann, *et al.*, 1956; Flickinger and King, 1972) and in freshwater fish (Ludke, *et al.*, 1971). No aldrin was found in 3 species of moribund snakes collected in rice fields (Flickinger and King, 1972) 2 weeks after the fields were planted with aldrin-treated seed in 1970. However, dieldrin residues ranged from 0.1 to 5.7 ppm in whole bodies of

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Photographs by Jack Dermid

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the snakes. Epoxidation of aldrin to dieldrin may occur rather slowly in turtles because of their low metabolic rate. A whole composite of 2 red-eared turtles (*Pseudemys scripta elegans*) that were collected alive in rice fields contained 4 times more aldrin (4.8 ppm) than dieldrin (Flickinger and King, 1972) 14 weeks after the fields were planted with aldrin-treated seed in 1970. Female yellow mud turtles were known to wander more than most turtles (Mahmoud, 1969). But, the yellow mud turtle and the red-eared turtles could have been exposed to aldrin in other rice fields more recently planted with treated seed.

ACKNOWLEDGEMENTS

We thank Harold E. Rawlings, rice grower, Iowa Colony, for use of his thorough records of rice planting dates for Brazoria County.

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AN ALBINO EASTERN BOX TURTLE, *TERRAPENE C. CAROLINA*, FROM NORTH CAROLINA

Hensley (1959) recorded albinism in the widespread and common box turtles, genus *Terrapene*, on the basis of a partially albinistic specimen of the eastern box turtle, *T. c. carolina*, from Ohio. I found only one other record of this anomaly in this genus, in an individual of the Gulf Coast box turtle, *T. c. major*, which showed partial cephalic albinism (Anonymous, 1968). I here report on the first case of complete albinism in *T. c. carolina*, in a North Carolina specimen.

The turtle, a juvenile, was found by an unidentified person on a cement carport in Cape Carteret, Carteret County in June 1976. The specimen was kept captive for about one year. It fed readily during early captivity, but it did not feed later on and died of unknown causes on 14 June 1977. Carapace length, width and height (in mm), respectively, at death were 42.7, 34.9 and 15.7; weight was 12.0 g.

The over-all color of the turtle appeared light yellow. Closer examination, however, revealed that the color of the carapace and of the head was actually a tightly mottled light yellow and white. Portions of the scales of the limbs were light yellow, and other portions were white. The undersides of the marginal scutes, the underside of the cervical scute, and the edge of the plastron were predominantly yellow, but with patches of white. The rest of the plastron was white, but with scattered small light yellow spots. The plantar surfaces of the feet were white. The iris of the eye was pink. All parts of the turtle in preservative appear white (Fig. 1). Conant (1975) presents color plates of a normally-colored live juvenile of this subspecies. My specimen is also unusual in that it has 13 marginal scutes per side instead of the usual 12. Behavior of the turtle when captured appeared to be normal.

I thank Fred C. Rohde, the fourth person to own the turtle, for passing the specimen on to me, for data on the turtle, and for several 35 mm color transparencies of it. The specimen is now in the collection of the Carnegie Museum (CM 70253).

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Figure 1. Dorsal view of albino juvenile *Terrapene c. carolina* from Carteret County, North Carolina.

A HIBERNATING EASTERN HOGNOSE SNAKE, *HETERODON PLATYRHINOS*

Published reports of hibernating snakes are numerous (see original data and literature review in Parker and Brown, 1973), but for the hognose snakes, *Heterodon*, detail is available only for the eastern hognose, *H. platyrhinos*. Neill (1948) reported that in Richmond county, Georgia, *H. platyrhinos* hibernates singly, beneath rocks, stumps, or rubbish piles, in burrows in hard red clay soil, and beneath slabs of tin, and that it is semi-dormant when disclosed. Anderson (1965) stated that it usually hibernates in rodent burrows in open fields and that it is conspicuously absent from the limestone ledge hibernacula that most snakes select. He noted (in Platt, 1969) that a specimen emerged from a thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) burrow on 8 April, and that a torpid *H. platyrhinos* was found in a mole tunnel at a depth of approximately three feet in mid-November. Platt (1969) stated that where the soil is suitable, the species probably hibernates in burrows which it has dug, and Collins (1974) reported that it burrows deep into loose soil or sand to overwinter. Platt (1969) noted that *H. platyrhinos* has not been found in hibernation dens with other species of snakes. Lee (1968), however, recorded one eastern hognose in hibernation with numerous individuals each of four species of snakes and seven species of amphibians, in and above a small spring in Baltimore County, Maryland. In view of the paucity of information available on hibernation in this otherwise well-known snake, the following observations, made in Pomona, Atlantic County, New Jersey, are of interest. Temperatures were taken with a Wesco rapid register thermometer.

At 2:45 P.M. on 16 October 1977, I observed an adult *H. platyrhinos* on the wide shoulder of a dirt road. Its head and neck were buried in a sand substrate, and the body extended and

the last one-third looped upon itself. No movement was noted during several minutes of observation. Suspecting that the snake was in the process of burying for hibernation, I did not disturb it. Not wishing to attract the attention of other persons nearby, I then left the area and returned periodically. At 3:45 P.M., the snake was about one-half buried; at 5:00 P.M. only the last 10 cm were visible; and at 5:40 P.M. the specimen was no longer visible on the ground nor in the open hole and was presumably buried. No movement of the exposed portion of the snake was ever noted. The weather was sunny and clear, with a moderate SW wind. Soil temperature near the digging snake (4:00 P.M., at about 2 cm depth) was 16.5°C, and air temperature (at ground level, in shade, and out of wind) was 18.5°C. The height of the hole left by the snake was 1.7 cm and the width 1.5 cm.

Much of the Pomona, New Jersey, region is coverd by young mature forest of black oak, *Quercus velutina*; white oak, *Q. alba;* shortleaf pine, *Pinus echinata;* and pitch pine, *P. rigida*, with a pronounced understory of blueberry, *Vaccinium* spp., and huckleberry, *Gaylussacia* spp. This association bordered the road shoulder 1 m from the digging snake, and for much of each day shaded the spot chosen by the snake. The shoulder itself was almost devoid of vegetation except for a few sapling sassafras, *Sassafras albidum*, and scattered patches of low mosses and lichens; much of the soil was exposed or thinly covered with scattered leaves and pine needles. The soil type where the snake was found is Klej loamy sand, 0 to 3% slopes (Johnson, 1978).

On December 1977 I attempted to locate the snake. The hole was still distinct. The burrow proceeded almost straight down, but I was able to follow it for only about 10 cm; I then continued to dig particularly carefully. The sandy substrate and the almost total absence of tree roots facilitated digging. I found the snake at 12:30 P.M., buried at a depth of 58 cm in moist sand and about 15 cm off the vertical as measured from the entrance hole. The snake was coiled (not looped *sensu* Brown, *et al.*, 1974). Immediately when uncovered, it moved relatively quickly and hissed, and made strong attempts to escape while its cloacal temperature was being taken; the specimen was definitely not sluggish. I then partly re-buried the snake in a loose coil prior to recording the temperature data; it immediately began to crawl slowly around the bottom of the hole with its neck spread. Cloacal temperature was 9.2°C; sand temperature (at 2 cm depth at spot where the snake was found) was 8.5°; and air temperature (taken as before) was 11.0°C. Weather was mostly sunny with a light NW wind.

A few minutes later, while carrying the snake a short distance to my home in order to measure and weigh it, it first vigorously attempted to escape, then spread its head and neck and coiled its tail in the characteristic bluffing display. It then quickly began the death feigning display and rolled on its back, opened the mouth, extended the tongue and partially everted the cloaca and made movements to void the contents (no material was expelled). Total length of the specimen was 46.5 cm and weight was 53.6 g. The snake was scale-clipped for future identification and carefully re-buried where found. On 17 January 1979 the area was thoroughly excavated again, and to a much larger extent than previously, but I found no snake or snake remains. The air temperature at the time was 3.0°C; surface soil temperature was 0.1°C; and soil temperature at 58 cm was 3.1°C, and may represent the annual low soil temperature at this depth at this spot. The soil was again distinctly moist, but not wet.

Although I cannot be positive, I suspect that the snake burrowed along an ant tunnel. The digging snake was found near the center of a small mound 15 cm long, 11 cm wide and to 3.2 cm high, and devoid of any living and dead vegetation. No ants were noted on 16 October or 3 December, perhaps because I did not observe carefully enough, but subsequent examination of photographs of the digging snake and the entrance hole suggests that this mound was an abandoned or little-used ant mound. When the area was excavated on 17 January 1979, a number of ants were noted in some of the few tunnels found. The tunnels were ± 0.8 cm wide and extended down to a depth of at least 60 cm. Use of ant tunnels and nests by hibernating snakes has been frequently noted (see partial literature review in Parker and Brown, 1973).

Conant (1938) and Klimstra (1958) recorded *H. platyrhinos* active from April to October in Ohio and in Iowa, respectively; the same is probably true of this species in New Jersey.

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Mean air temperatures when the snakes were entering and leaving hibernation in Ohio ranged from 10.0-15.6°C (Conant, 1938). Air temperature data obtained from the National Oceanic and Atmospheric Administration for Pomona, New Jersey indicate that for October 1977 the average daily maximum temperature was 18.1°C, the average daily minimum 7.3°C and the monthly average 12.7°C; these temperatures are all slightly below those of a 30-year mean. For fall 1977, the first average daily temperature in the 10°C - 15°C (50's F) range occurred on 3 October and continued each day until 16 October. The first fall 1977 daily average in the 4.4°C - 9.9°C (40's F) temperature range occurred on 17 October, the first temperature below 4.4°C (in the 30's F) occurred on 11 October, and the first freezing temperature on 12 November.

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Herpetological Husbandry

This section of **Herpetological Review** deals specifically with the husbandry of captive reptiles and amphibians. Articles concerning any aspect of successful exhibit design, techniques for maintenance and breeding, egg incubation, and rearing of the young are acceptable based on the success of the husbandry program, the quality of written work, and the overall value of the presented material to the herpetological community. Reproductive articles should stress the actual methods and specimen manipulation involved but may also include observations of behavior, growth, and statistical data. Of particular interest are reports describing consistently successful, long term programs which deal with large numbers of a single species or genus.

Longer husbandry manuscripts should be divided into appropriate sections including Literature Cited. Black and white photos and line drawings are acceptable. All manuscripts will be reviewed by the Section Editor, and frequently by another individual within the particular area of expertise. Reports which do not deal with herpetological husbandry *per se* (for example, the description of eggs and young from a wild-caught gravid female) will be forwarded to the Editor for consideration as a Feature Article. In order to reduce publication time, husbandry articles should be sent directly to the Section Editor, Bern W. Tryon, Dept. of Herpetology, Fort Worth Zoological Park, 2727 Zoological Park Drive, Fort Worth, TX 76110.

OBSERVATIONS ON THE REPRODUCTION OF THE COMMON ANACONDA, *EUNECTES MURINUS*, AT THE NEW YORK ZOOLOGICAL PARK

Eunectes murinus is a semi-aquatic boid whose range extends over much of tropical South America (Peters and Orejas-Miranda, 1970). The breeding season for *E. murinus* varies throughout its range and is summarized by Fitch (1970). Additional breeding data are provided by Dixon and Soini (1977).

Information on the captive breeding of *E. murinus* is meager (Deschanel, 1978). Between 5 February 1978 and 30 November 1978 three female *E. murinus* gave birth at the New York Zoological Park (=NYZP). Observations on growth and reproductive behavior of the parents and pertinent reproductive data were recorded. Post-parturient behavior was noted and will be discussed in a later account.

A female *E. murinus* (NYZP #760033, = female #1), acquired in June 1971, measured 1.42 m in total length (= TL) and weighed 1.35 kg. Estimated age was one year. In June 1975 a 1.83 m TL, 7.7 kg male (NYZP #760034, = "the male") was acquired as a prospective mate. Age was estimated at three years. The two were placed together on 15 April 1976. Female #1 then measured 3.2 m TL and weighed 25.5 kg; the male 2.4 m TL and 11.4 kg. On 9 May 1976 they were placed in an exhibit enclosure measuring 2.45 m by 1.85 m by 1.75 m high. Substrate consisted of smooth river gravel. An oval pool 1.35 m by 1.0 m by 0.31 m deep was provided on one side. Tempered water maintained at 28°C (±2°) was continually added to the pool. Air temperature was 27°C (± 2°). A heating coil at one end of the cage provided a substrate thermal gradient of 26°C to 30°C. The exhibit was dimly illuminated by three 75 watt Duro-Test incandescent flood lights. The photoperiod was 8.5 to 9 hours per day year round.

On 11 October 1976 a second female (NYZP #760241, = female #2) was added to the group. This female, approximately 3 m TL, was born in February or March 1971 in Iquitos, Peru (Timothy Warke, pers. comm.). In March 1978 she weighed 45.64 kg at 3.8 m TL.

A third female (NYZP #770291, = female #3), 3.3 m TL and 25.54 kg in weight, was introduced on 6 April 1978. Female #3 was acquired in November 1971 at .91 m TL and was judged to be less than one year old.

Each member of the *E. murinus* group was offered food once per week. Diet items included freshly killed domestic ducks, chickens, rabbits, and laboratory rats.

On 24 May 1977 the male and female #1 were observed courting at 1500 hours and continued for at least two hours. Courtship took place within the pool. The male frequently flicked his tongue over the dorsal areas of the female as he aligned the anterior portion of his body over the same region of the female's body. The posterior portion of the male's body and tail completely encircled the female's cloacal region several times. Subsequent courtship involved both encircling and draping of the female's body by the male. Copulation was not noted. This was the first reproductive behavior noted for any of the four snakes. Since then, courtship between the male and female #2 has been observed on nine occasions between 5 April and 26 May 1978 and on 7, 23, and 26 May 1978 it terminated in copulation lasting from ½ to 2 hours. Courtship and copulation were noted between the male and female #3 on 22 May 1978. Sexual activity has only been observed in the water and usually occurred shortly after reintroduction of the previously separated male to the enclosure. Separations were from one to seven days.

Female #1 fed twice between courtship and parturition. Female #2 fed seven times and female #3 not at all.

On 17 October 1977 female #1 was radiographed and appeared to contain multiple egg masses of uniform opacity. Her weight was 30.3 kg. An additional radiograph taken 2 February 1978 disclosed numerous fully formed skeletons. Although a portion of the embryos appeared to be in the normally coiled enveloped position, others were outstretched, suggesting that they had already emerged from the embryonic membranes while still within the oviduct (see Figure 1).

By 0830 hours, 5 February 1978, female #1 had given birth to twenty-seven young. None were enveloped upon discovery and all umbilical herniae were closed. At birth they weighed 210.4-278.0 g, $\bar{x}$ = 249.2 g. Total length was 800-855 mm, $\bar{x}$ = 843.9 mm.

Female #3 had at least twenty-three young between 0830 and 0930 hours on 19 November 1978. None were enveloped but almost all had umbilici and fetal membranes attached. Twenty-two of the young weighed 191.8-230.5 g, $\bar{x}$ = 206.2 g, and measured 730-765



Figure 1. Radiograph taken 2 February 1978 revealing outstretched young within ovaduct of female #1 three days prior to parturition.

mm, $\bar{x}$ = 748 mm TL. One undeveloped egg was passed.

Parturition in female #2 occurred sometime between 1630 and 2210 hours, 30 November 1978. The litter included twenty-eight live and two dead young. One undeveloped egg was passed. When discovered, none were enveloped and all but one of the live young had shed fetal membranes and umbilici. The thirty young weighed 248.2-302.5 g, $\bar{x}$ = 265.4 g, and total lengths were 855-900 mm, $\bar{x}$ = 877.1 mm.

Females #2 and #3 generally remained in the pool during gestation, while female #1 usually was coiled directly over the substrate heating coil, an area normally avoided by all four snakes. Accelerated shedding cycles were experienced by all three females during gestation. Females #2 and #3 each shed normally six times while female #1 experienced three periods of opacity that did not terminate in ecdysis, followed by four complete shedding cycles. The resulting shed skins were abnormally thick. Presumably the shedding abnormalities experienced by female #1 were related to the dessicating effects of the heating coil. Female #1 was frequently observed breathing with her mouth partly open while in the heated area. During the twelve month period previous to gestation, females #1 and #2 each shed seven times, while female #3 shed five times.

Based on their size and the rate of growth of young *E. murinus* in the New York Zoological Park collection, the three female *E. murinus* were estimated to have reached sexual maturity in their sixth or seventh year. Although the male's early history was unknown, he was estimated to have achieved sexual maturity at five years of age.

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WILLIAM F. HOLSTROM, JR.
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A LONGEVITY RECORD FOR *CTENOSAURA PECTINATA* (REPTILIA: IGUANIDAE)

Gibbons (1976) gives comparative longevity records for the Class Reptilia and indicates that only 18 species are reported attaining 10 years of age, of these only six attain 15 years (of which *Ctenosaura pectinata* is not listed), and of these only two species live to 20 years in captivity.

The previous published longevity record *C. pectinata* was 8 years 2.5 months (Bowler, 1975). This specimen was maintained at the Dallas Zoo; it died in March 1978 (J. B. Murphy, Personal Communication, 1978), giving it a total minimum age of 11.5 years.

The 1963 College of Idaho Field Biology Expedition collected a juvenile male *C. pectinata* on July 31, 1963 in Mazatlan, Sinaloa, Mexico. The collection site is at Latitude 23°13'N, Longitude 106°25'W and at an elevation near zero.

At the time this paper was submitted (1 April 1980), the lizard was alive and had attained a minimum age of 16 years, 9 months. The lizard grew the first 2-3 years in captivity and was estimated to be approximately 3-4 years of age on capture.

It now has a snout-vent length of 30 cm, a total length of 72 cm, and a weight of ca. 900 g.

The *C. pectinata* has been housed since August 1963 in a large glass terrarium with a sandy substrate and a UV light source. The diet of the lizard has consisted mainly of apples, small tomatoes, lettuce, and dandelion flowers, depending on seasonal availability.

The specimen apparently has a condition known as fibrous osteodystrophy, a common disorder in iguanas fed mainly lettuce and fruit (Frye 1973). The lizard has a good appetite, despite the aforementioned illness and failing vision.

ACKNOWLEDGEMENTS

We appreciate discussions with James B. Murphy (Dallas Zoo) and J. Kevin Bowler (Philadelphia Zoological Garden) concerning this record.

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WILLIAM H. CLARK
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CAPTIVE PROPAGATION IN THE LANCEHEAD RATTLESNAKE, *CROTALUS POLYSTICTUS*

Little is known about reproduction in the lancehead rattlesnake, *Crotalus polystictus*. Klauber (1972) reported litters of 3 and 20. Armstrong and Murphy (1979) recorded litters of 10, 12, and 3 litters of 7 offspring. Two females, collected by Robert E. Humphries near Tapalpa, Jalisco, Mexico, had litters of 6 each. All litters were from wild caught gravid females.

On 21 July 1978 a pair of *C. polystictus*, captive since September 1973, produced a litter of three. This is the first report of captive propagation. This pair was maintained in a glass-fronted display measuring 60 x 40 x 55 cm. The substrate was small rocks with larger rocks stacked so that hiding spaces were available. Oak leaves and dried plants also provided cover. Freshly killed adult white mice were fed to the pair approximately every 21 days. Water was provided in a glass dish.

Courtship activity was similar to *Crotalus d. durissus* (Armstrong and Murphy 1979). Copulation was first observed on 3 August 1977. Coitus lasted 8 hours. No movement from either snake during coitus was observed. The female's cloacal region was distended during coitus and after separation. The snakes also copulated 11 August 1978, 21 days after birth of the offspring.

The adults were sprayed with chilled water (5°C) every morning from June through

August. A constant temperature of 29° C was maintained in the display but after spraying, the temperature dropped to 23° C. This always stimulated male courtship activity. The spraying period corresponded to the summer rainy season of the high plateau environment inhabited by *C. polystictus*.

The young were measured to the nearest millimeter (Quinn and Jones 1974) and weighed to the nearest .1 g. Total length of the young were 223, 210 and 207 mm ($\bar{X}$=213.3 mm). The young (n=48) reported by Armstrong and Murphy (1979) had a mean length of 214 mm. The weights of my neonates were 10.2, 10.4 and 8.8 g ($\bar{X}$=9.8 g). The neonates described by Armstrong and Murphy (1979) had a mean weight of 8.9 g. The young shed 9-11 days after birth and then fed readily on newborn mice.

ACKNOWLEDGEMENTS

I am indebted to James B. Murphy for supplying additional data and to Hugh R. Quinn and John E. Werler for reviewing this manuscript. My appreciation is also extended to the Herpetological staff of the Houston Zoological Gardens. The specimens will be deposited at University of Texas (Arlington) upon death.

LITERATURE CITED

Armstrong, B. L. and J. B. Murphy. 1979. The natural history of Mexican rattlesnakes. Univ. Kansas. Mus. Nat. Hist. Spec. Pub. 5: *In Press.*

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NEWSNOTES

U.S. SEA TURTLE STAMPS

Strong support is needed for the IUCN Marine Turtle Specialist Group's petition to the U.S. Postal Service to create a series of sea turtle stamps. These commemorative stamps would be intended to increase public awareness of endangered sea turtles. Four species that occur in U.S. waters would be featured. Readers are urged to send letters of endorsement to Mr. William Bolger, Postmaster General, Washington, D.C. 20260. ●

ERRATA: HR 11(1)

Contents, Legislative Alert, p. 8, not p. 9.●

NC HERPETOLOGICAL SOCIETY RECEIVES CONTRACT TO STUDY *HYLA ANDERSONI*

The North Carolina Herpetological Society has signed a $3,000 contract with the US Fish and Wildlife Service to study the distribution of *Hyla andersoni* in North Carolina. The research will be conducted under the guidance of society advisor Ray Ashton, North Carolina State Museum. The three primary purposes of the study are to check the 43 historic site records, (10 years or older). These sites will be visited to determine if the habitat will still support pine barrens treefrogs and, hopefully, to locate frogs at these locations; secondly, new sites will be located and habitat type and size will be determined;

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and data will be shared with a similar project being headed up by Larry Wilson at Clemson University.

Several teams will be mobilized to cover various assigned regions of the coastal plain on nights when *H. andersoni* should be active. Each team will collect voucher specimens, calling population data, habitat information, and exact localities of each call site.

The NC Herp Society is involved in a similar study on the distribution of *Clemmys muhlenburgi* in the western part of North Carolina. This study is being headed by Ray Johnson of Durham, NC. The conservation committee of the society, headed by John Wiley and Wilson Laney of NC State University, is collecting information on Laurinburg Pond, a site where numerous coastal plains herps breed. This data is being turned over to the NC Heritage Program and the Nature Conservancy with the hope that these institutions can save the area. ●

MALDIVIAN TURTLE STAMPS

The Republic of Maldives has issued a series of postage stamps depicting seven species of sea turtles found in their waters. Cost per set is Rs 14.93; this includes the *Chelonia mydas* souvenir sheet. The special first-day cover envelope costs Rs 1.00 (exchange rate: U.S. $1.00 = M. Rs 3.93). Individual stamps are also available. Order from Postmaster, General Post Office, Malé, Republic of Maldives. ●

TURTLE CATALOG ACCOUNT VOLUNTEERS

Attempts to contact four individuals who have been assigned turtle accounts to prepare for the *Catalogue of American Amphibians and Reptiles* have failed:

Robert Feuer (*Chelydra generic, Chelydra serpentina*),
Keith Hawthorne (*Caretta generic, Caretta caretta*),
Douglas Reagon (*Terrapene carolina*),
Roger Sanderson (*Graptemys barbouri*).

Correspondence to their last known address has gone unanswered. If any of the above individuals are still interested in preparing these delinquent accounts they should immediately contact the Testudines Section Editor, Dr. Carl H. Ernst, Department of Biology, George Mason University, Farifax, Virginia 22030! If the editor does not hear from them by September 1st, the accounts will be forfeited and reassigned. ●

MARINE TURTLE AGING RESEARCH

Specimens or information on specimens of marine turtles of known age, to be used in a study of age-determination.

Dr. J. Frazier
Department of Vertebrate Zoology
National Zoological Park
Smithsonian Institution
Washington, D.C. 20008 ●

HERPETOLOGICAL ASSOCIATION OF AFRICA

The Herpetological Association of Africa is now 15 years old, but can trace its genealogy back a further 7 years to the birth of its parent Society - The Herpetological Association of Rhodesia. During this long period the Association's Journal has been, and remains, the only publication dealing specifically with African herpetology.

The Journal (3-4 issues a year) is well illustrated, and caters for both the professional and amateur herpetologist. Membership is open to all interested persons (R4.00 or $6.00 per annum) and details can be obtained from the Secretary, Dr. W.R. Branch, Port Elizabeth Museum, Box 13147, Humewood 6013, Port Elizabeth, South Africa. ●

FORCE FEEDING INFO DESIRED

Larry Cartmill (785 Mohawk Drive, Barboursville, W. Va. 25504) reports good success raising juvenile *Elaphe obsoleta rossalleni* and *Crotalus horridus* by force-feeding pink mice and pieces of adult mice. He would like to correspond with others having similar experiences. ●

NEW PUBLICATION

"CHECKLIST AND KEY TO THE AMPHIBIANS AND REPTILES OF LOUISIANA"
SECOND EDITION
1979

By: Edmund D. Keiser and Larry David Wilson
Available from: Lafayette Natural History Museum
637 Girard Park Drive
Lafayette, Louisiana 70503
U.S.A.
Prices: $3.00 per copy plus $.48 postage and handling. Five or more copies, $2.00 each. Library discounts are available. Louisiana residents must add 5% sales tax. ●

DICEPHALIC *KINOSTERNON*

On July 1, 1979 a Yellow Mud Turtle (*Kinosternon flavescens*) which had recently been collected near Levelland, Texas (Hockley County) laid three eggs. The eggs were maintained in a medium of Cypress Bark Mulch at room temperature and hatched on August 8, 1979. To our surprise, we found one of the youngsters to be dicephalic.

LOUIS PORRAS and **JOE BERADUCCI**
The Shed, 6932 NW 46th St.
Miami, Fla. 33166 ●



A CLARIFICATION

Please add the following, which was omitted from my article on page 115 of Herp Review 10(4): after male (483 mm total length) *collected 31 March 1971, 1.7 km SW Switzerland, Jasper Co., S.C.* There has been some question as to whether the female was gravid when collected. With the addition of the male's collecting data this should clear up the matter.

DENNIS W. HERMAN
Sr. Keeper, Herpetology
Atlanta Zoo ●

A CONVENIENT KILLING AGENT FOR AMPHIBIANS

A collecting trip that involves hiking into inaccessible areas or a business or pleasure trip combined with a little collecting often demand that collecting equipment be kept to a minimum. Aqueous killing agents demand more weight, another jar, etc.

Medication for toothaches that come in a gel form and packaged in a neat, flexible squeeze tube alleviate these problems. These gels (e.g., Ora-jel, Commerce Drug Company), which are available in any drug store, contain benzocaine. A quite small amount smeared on the top of the head of an amphibian will kill it in a completely relaxed condition within a few minutes. The technique was not tried on any reptile, but it should work, at least on small species.

An additional advantage is that the compounds will pass through international customs without any hassle from the officials.

RONALD ALTIG
Department of Biological Sciences
Mississippi State University
Mississippi State, Mississippi 39762 ●

SYMPOSIUM REPORT

The Fourth International Symposium on African Amphibians met in Florence, Italy, December 10-15, 1979. There were 24 participants from 10 countries. The meeting was organized by Dr. Jean-Jacques Morere, Paris, France, and Dr. Raymond Laurent, Tucamen, Argentina. It was hosted by Dr. Bendetto Lanza, at Museo Zoologica de "La Specola" in Florence. Drs. J. P. Bogart, Christina Richards, Margaret Stewart, and Mills Tandy attended from North America. ●

Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same.

These geographic distribution records have a **standard format,** and all authors should adhere to that format, as follows: SCIENTIFIC NAME, COMMON NAME (as it appears in **Standard Common and Current Scientific Names for North American Amphibians and Reptiles** , Collins, Huheey, Knight and Smith, 1978), LOCALITY, (use **metric** for distances), DATE (day, month, year), COLLECTOR(S), VERIFICATION BY, PLACE OF DEPOSITION AND CATALOG NUMBER (required), COMMENTS, CITATION(S), SUBMITTED BY (give name and address).

Some further comments. This geographic distribution does not publish "observation" records. Records submitted should be based on preserved specimens which have been placed in a university or museum collection (private collection depository records are discouraged).

Please submit new geographic distribution records in the **standard format** only to Joseph T. Collins, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. Short manuscripts are discouraged, and are only acceptable when data **cannot** be adequately presented in the standard format.

Recommended citation for new distribution records appearing in this section is: Jones, J. 1980. Geographic distribution: *Lampropeltis triangulum multistrata.* SSAR Herp. Review 10(1):1.

CAUDATA

AMBYSTOMA TEXANUM (Smallmouth salamander). USA: TEXAS: Bell Co: small side canyon of Bear Creek, Fort Hood Military Reservation, 5.5 Km SW of Owl Creek community. 30 April 1978. R. W. Neck. Verified by R. W. Neck. Texas Memorial Museum (TNHC #48759). Found on protected (north exposure) slope of *Acer grandidentatum - Quercus muhlenbergia - Quercus texana* woodland. Small depression in bedrock (Cretaceous Edwards Limestome) available for oviposition micro-habitat. Medium-sized individual (s-v 39.0 mm, total 64.8 mm) found in deep soil/litter pocket upslope from boulder; microsite also supported relicit population of several terrestrial gastropods. Previous records from this area (Raun & Gehlbach, 1972, Amphibians and reptiles in Texas) were Lampasas Cut Plains crenophilic microhabitats now inundated by Belton Lake. This record documents survival of isolated populations above this reservoir in drainage basin of Leon River above Belton lake. Existence of *A. texanum* in this area is also of interest because habitat is more typical of *Plethodon glutinosus* which can be found in isolated mesic slopes and epigaeal microhabitats in Texas Hill Country northward to Bell County.

Submitted by **RAYMOND W. NECK**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. ●

HEMIDACTYLIUM SCUTATUM (Four-toed Salamander). USA: NEW YORK: Jefferson Co: Township of Alexandria, beech-hemlock forest, ca. 60 m E of the intersection of N.Y. Route 12 and Cranberry Creek. 26 August 1976. P. J. Petokas. American Mus. Nat. Hist. (AMNH 104811). Verified by M. W. Klemens. This report provides more precise locality information than is presently available for range in the Thousand Islands region of New York. Bishop (1941, New York State Mus. Bull. 324:195) reported a Hobart College specimen marked "Thousand Islands, summer 1900," and Werner (1959, Copeia 1959(2):170-172) mentioned finding this species on the New York mainland, but did not give locality data. Neill (1963, Cat. Am. Amphib. Rept. 2:1-2) did not include this area in his description of the range of *Hemidactylium.*

Submitted by **PETER J. PETOKAS,** U.S. Fish and Wildlife Service, 100 Grange Place, Cortland, New York 13045 and **MAURICE M. ALEXANDER**, Department of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry, Syracuse, New York 13210. ●

NECTURUS MACULOSUS (Mudpuppy). USA: MINNESOTA: Kanabec Co: (T 41N, R 23W, Sec. 33) in Snake River above Mora. 1976. J. I. Stewart. Preserved specimens housed at University of Minnesota Fisheries Department. About 100 individuals observed during spring, summer, and fall while electrofishing for smallmouth bass. Found under boulders near the margins of the river. Confirms presence in east central Minnesota (Breckenridge, 1944, *Reptiles and Amphibians of Minnesota*, University of Minnesota Press; Minnesota Dept. of Natural Resources, 1979, Guide to the Reptiles and Amphibians of East Central Minnesota - Region 3E).

Submitted by **JAMES I. STEWART** and **PHILIP A. COCHRAN**, Department of Entomology, Fisheries and Wildlife, University of Minnesota, St. Paul, Minnesota 55108. ●

ANURA

BUFO WOODHOUSEI WOODHOUSEI (Woodhouse's Toad). USA: TEXAS: Briscoe Co: Lake Theo. 13 June 1979. R. W. Neck. Verified by R. W. Neck. Texas Memorial Museum (TNHC 48760). Collected on shoreline of artificial impoundment immediately behind dam. Extends known range from adjacent Donley County.

Submitted by **RAYMOND W. NECK**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. ●

GASTROPHRYNE OLIVACEA (Great Plains Narrowmouth Toad). USA: TEXAS: Briscoe Co: Dissected terrace top above Holmes Creek at upper end of Lake Theo. 4 October 1977. R. W. Neck. Verified by R. W. Neck. Texas Memorial Museum (TNHC 48761). Collected approximately 7 m above Lake Theo on overgrazed slope with scattered grass and scrub cover. Extends range approximately 100 km NW from Cottle County.

Submitted by **RAYMOND W. NECK**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. ●

HYLA GRATIOSA (Barking Treefrog). USA: TENNESSEE: Hardeman Co: 2.4 km NW Toone. 17 June 1969. Virginia M. Norton. Identified by William H. Redmond (University of Tennessee at Knoxville), verified by A. Floyd Scott (Austin Peay State University). Memphis State University Museum of Zoology, MSUMZ A2142. Incorrectly identified as *Hyla cinerea* initially (Norton, V.M. and M.J. Harvey. 1975. Herpetofauna of Hardeman County, Tennessee. J. Tennessee Acad. Sci. 50(4): 131-136.). First record for state west of Tennessee River, third known locality in Tennessee. Extends range ca. 130 km NW of nearest population (Alabama: Lauderdale County), ca. 220 km SW of nearest Tennessee population in Montgomery County, and ca. 320 km W of only other Tennessee population in White County (Scott, A.F. and D.F. Harker. 1968. First records of the barking treefrog, *Hyla gratiosa* Le Conte, from Tennessee.



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Herpetologica 24(1):82; Scott, A.F. and D.H. Snyder. 1968. The amphibians and reptiles of Montgomery County, Tennessee. J. Tennessee Acad. Sci. 43(3):79-83.). The range of this species is discontinuous as is shown by Conant (1975. A Field Guide to the Amphibians and Reptiles of Eastern and Central North America, Houghton Mifflin Co., Boston).

Submitted by **JAMES S. JACOB**, Ecological Research Center, Department of Biology, Memphis State University, Memphis, Tennessee 38152. ●

PSEUDACRIS CLARKI (Spotted Chorus Frog). USA: TEXAS: Briscoe Co: North Prong of Little Red River, 7.3 km NW Lake Theo Dam. 3 October 1977. R. W. Neck. Verified by R. W. Neck. Texas Memorial Museum (TNHC 48763). Collected around plunge pool from stairstep breaks of Ogallala Formation. Extends known range from adjacent Armstrong County on north, but large gap still exists to southeast in drainage basins of Wichita and Pease Rivers.

Submitted by **RAYMOND W. NECK**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. ●

PSEUDACRIS TRISERIATA TRISERIATA (Western Chorus Frog). USA: KANSAS: Clark Co: 24 km N Ashland. 21 April 1979. R. Powell, H. Gregory, J. Parmerlee. Verified by J. T. Collins, University of Kansas Museum of Natural History. Bobby Witcher Memorial Collection, Avila College, BWMC 825, donated to University of Kansas Museum of Natural History (KU 183826). New county record extends range into the Red Hills (Collins, 1974. Amphibians and Reptiles in Kansas. UKMNH Publ. Ed. Ser. No. 1 pp. 61-63). Western chorus frogs were co-existing with spotted chorus frogs (*Pseudacris clarki*) in small pond (Smith, P.W. and D.M. Smith 1952. Amer. Midl. Nat., 48(1):165-180).

Submitted by **ROBERT POWELL**, Department of Natural Sciences, Avila College, Kansas City, Missouri 64145. ●

RANA CATESBEIANA (Bullfrog). USA: TEXAS: Briscoe Co: Lake Theo. 5 October 1977. R. W. Neck. Verified by R. W. Neck. Upper reaches of Lake Theo support thriving population which is undoubtedly introduced as Lake Theo is artificial impoundment constructed in the early 1960's. This record is an extension of approximately 180 km up drainage basin of Red River to base of Eastern Caprock Escarpment.

Submitted by **RAYMOND W. NECK**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. ●

SCAPHIOPUS HOLBROOKI HURTERI (Hurter's Spadefoot). USA: ARKANSAS: Cleburne Co: 2.0 km NW of Greer's Ferry Lake on AR 16 at Edgemont, T11N, R11W, Sec. 7. 23 April 1966. Paul Elick. Verified by W.W. Byrd and V.R. McDaniel. Arkansas State Herpetol. Mus. (ASUHM 3816). First specimen known from central Arkansas and from the hiatus presently separating the ranges of *S. h. holbrooki* and *S. h. hurteri* (Dowling, H.G. 1957. Occ. Pap. U. Arkansas Mus. 3: 1-51; Conant, R. 1975. A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston).

Submitted by **CHRIS T. McALLISTER** and **V.R. McDANIEL**, Department of Biological Sciences, Arkansas State University, State University, Arkansas 72467. ●

TESTUDINES

KINOSTERNON SUBRUBRUM HIPPOCREPIS (Mississippi Mud turtle). USA: Florida: Wakulla Co: St. Marks National Wildlife Refuge, 16.6 km E of Crawfordville. 6 May, 1979. R. Seigel, N. Seigel, and D. Niver. Verified by P. C. H. Pritchard. Univ. of Central Florida, uncatalogued. Extends range approximately 211 km E of previously recorded locality (Conant, 1975, a Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co; Boston). Adult male, carapace length 7.1 cm. P. C. H. Pritchard (pers. comm.) suggests some minor *K. s. subrubrum* influence is present in this specimen, indicating that the two subspecies intergrade over a wider area than previously believed. Additional collecting in the immediate area east of this locality would be useful in determining the extent of intergradation.

Submitted by **RICHARD A. SEIGEL**, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045, and **NADIA A. SEIGEL**, Department of Biological Sciences, University of Central Florida, Orlando, Florida 32816. ●

TERRAPENE O. ORNATA (Ornate Box Turtle). USA: TEXAS: Briscoe Co: Lake Theo. Prior to 17 May 1979. M. Robertson. Verified by R. W. Neck. Dead remains collected in association with Lake Theo. Subsequently on 15 June 1979, one DOR and one crossing road observed on FM 1065 within Quitaque city limits. Extends range from four or six contiguous counties.

Submitted by **RAYMOND W. NECK**, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. ●

SAURIA

CNEMIDOPHORUS TESSELATUS (Colorado Checkered Whiptail). USA: TEXAS: Hutchinson Co: 1 km W of RR 1319 on County Road 3071 (35° 43' N 101° 35' W). 22 July 1979. Collected and identified by F.C. Killebrew. West Texas State University 4057. Extends range *ca.* 80.5 km north (Raun and Gehlbach, 1972. *Amphibians and Reptiles in Texas. A Taxonomic Synopsis, Bibliography, and County Distribution Maps*); new county record, and fills in distributional gap between previous localities in Potter County, Texas and Cimarron County, Oklahoma (Webb, 1970, *Reptiles of Oklahoma*. University of Oklahoma Press, Norman). Several other specimens were collected and released.

Submitted by **F. C. KILLEBREW**, Biology Department, West Texas State University, Canyon, Texas 79016. ●

COLEONYX VARIEGATUS BOGERTI (Tucson Banded Gecko). USA: NEW MEXICO: Hidalgo Co: Dump, 3 km W junction New Mexico Rts. 530 and 92, T19S, R21W, sec 14 or 15. 17 & 24 August 1977. Riley Springs, Riley Canyon, T18S, R20W, sec 20. 17 August 1977. D. G. Johnson. Verified by A. H. Price. New Mexico State University (NMSU 5216-5218). These localities are 20 km east of the nearest locality in Arizona and 75 km north of the northernmost previous locality in New Mexico (Axtell, 1974, Symposium on the Biological Resources of the Chihuahuan Desert Region, United States and Mexico, Proceedings and Transactions of the National Park Service, No. 3, p. 503) and extend the range of this species north of the Gila River in New Mexico (Dixon, 1970. *Coleonyx variegatus*. Cat. Amer. Amphib. Rept. 96.1-96.4).

Submitted by **ANDREW H. PRICE**, Department of Biology, Box 3AF, New Mexico State University, Las Cruces, New Mexico, 88003. ●

EUMECES ANTHRACINUS (Coal Skink). USA: TENNESSEE: Benton Co: 3.2 km S Eagle Creek. 13 April 1979. J. S. Sanders and J. S. Jacob. Verified by M. V. Plummer (Harding University). Memphis State University Museum of Zoology (MSUMZ R1578). First record from state west of Unaka Mountain Province in east Tennessee, represents third known locality and fourth specimen from state. Only known museum specimen of *E. anthracinus* from Tennessee. Extends range into west Tennessee ca. 100 km N of nearest population (in northeastern Mississippi), and ca. 360 km W of only other known localities in Monroe and Polk Counties in east Tennessee (Johnson, R. M. 1958. A Biogeographic Study of the Herpetofauna of Eastern Tennessee, Unpubl. Ph.D. Thesis, University of Florida; A. C. Echternacht and W. H. Redmond, pers. comm.). Specimen appears to be intergrade between *E. a. anthracinus* and *E. a. pluvialis*

(Mount, R. H. 1975. The Reptiles and Amphibians of Alabama, Auburn University). Collected under piece of roofing tin in hardwood riparian habitat. Herpetofaunal associates were *Scincella lateralis, Eumeces fasciatus,* and *Sceloporus undulatus.* The range of *E. anthracinus* has not been previously shown to extend into Tennessee (Conant, R. 1975. A Field Guide to the Amphibians and Reptiles of Eastern and Central North America, Houghton Mifflin Co., Boston).

Submitted by **JAMES S. JACOB** and **J. STEPHEN SANDERS**, Ecological Research Center, Department of Biology, Memphis State University, Memphis, Tennessee 38152. ●

HEMIDACTYLUS TURCICUS (Mediterranean Gecko). USA: TEXAS: El Paso Co: El Paso. 3 September 1979. R. J. Long. Identified by A. H. Price. New Mexico State University (NMSU 5602). This specimen fills a hiatus between introduced populations 535 rd km to the west in Tucson, Arizona (Robinson and Romack, 1973, J. Herpetology 7(3): 311-312) and 697 rd km to the southeast in Del Rio, Texas (Davis, 1974, J. Herpetology 8(1): 77-80). It was collected on a residential building approximately 1.6 km from an oil refinery that was receiving shipments of pipe earlier in the summer from San Antonio, Texas, 948 rd km to the southeast, another location of a population of this species and a likely source for this introduction. Several other geckos were seen on the walls of the building by the residents in the weeks preceding the capture of this specimen, a hatchling. It is unknown whether or not they represent a viable population. It is to be expected that this species will eventually turn up in almost any town of sufficient size in the desert southwest.

Submitted by **ANDREW H. PRICE**, Department of Biology, Box 3AF, New Mexico State University, Las Cruces, New Mexico, 88003. ●

PHYLLODACTYLUS H. HOMOLEPIDURUS (Leaf-toed Gecko). MEXICO: SONORA: Punta Cirio (10 km SSE of Puerto Libertad). 21 March 1979. V. L. Tripi and J. E. Minnich. Identified by J. R. Dixon. Milwaukee Public Museum (MPM 18530). Northernmost record on the coast of Sonora. Previous closest record is "31 mi N Hermosillo" and previous northernmost record on Sonoran coast is "La Posa, San Carlos Bay" (Dixon, J. R., 1964. New Mexico State University Scientific Bulletin 64-1:1-139). Extends previous known range 160 km west-northwest and along the coast 260 km northwest. The juvenile female specimen (snout-vent length = 35 mm) was collected while inactive in the morning (9:00 A.M. MST) under granite boulder. Plant associates were *Idria columnaris* (boojum), *Pachycereus pringlei* (cardon), *Encelia farinosa* and numerous forbs (mainly *Lupinus*). Because of possible overlap with populations of *P. xanti* from islands in the Gulf of California (Dixon, J. R., 1964, *op. cit.,* and 1969, Catalogue of American Amphibians and Reptiles 79:1-2), the following diagnosis by J. R. Dixon is presented: postmentals 2, followed by 6 granules, contacting 2 anterior labials on each side; orbital scales across center of eyes 18-19 (palpebrals not included); third labial snout scales 20; longitudinal venter scales 32; transverse venter scales 58; tail with 2/0 reduction on anterior fourth; basal tail tubercles in 4 rows; dorsal tubercle rows 12 (14 past mid-body); tubercles from rear of head to base of tail 33, from axilla to groin 21; scales from eye to nostril 11; internasal border scales 7; fourth toe lamellae 14.

Submitted by **JOHN E. MINNICH**, Zoology Department, University of Wisconsin—Milwaukee, P. O. Box 413, Milwaukee, Wisconsin 53201. ●

SERPENTES

ARIZONA ELEGANS OCCIDENTALIS (California Glossy Snake). MEXICO: BAJA CALIFORNIA DEL NORTE: 20.9 km N jct Mex. Rt. 1 and Mex. Rt. 1 (to Bahia de los Angeles). 1 July 1978. W. Seifert. Dallas Museum of Natural History (DMNH 4763). 8 km N jct Mex. Rt. 1 and Mex. Rt. 1 (to Bahia de los Angeles). 1 July 1978. W. Seifert. (DMNH 4765). Previously only recorded along the west coast of Baja California as far south as El Rosario (Dixon and Fleet, *Arizona elegans* SSAR Cat. Amer. Amph. Rept. 179.1-179.4). These specimens offer a link with *A. e. pacata* which occurs only a few kilometers south and west of this reported locality. However, their dorsal body blotch count yields no evidence of intergradation with that race.

Submitted by **WAYNE SEIFERT**, Division of Lower Vertebrates, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226. ●

REGINA GRAHAMI (Graham's Crayfish Snake). USA: TEXAS: Hemphill Co: 1 km S of Canadian River on U.S. 83. 12 June 1978. G. Rhea. Verified by F. C. Killebrew. West Texas State University Natural History Collection 4056. Extends range *ca.* 130 km northwest (Webb, 1970. *Reptiles of Oklahoma,* University of Oklahoma Press, Norman).

Submitted by **F. C. KILLEBREW** and **MILES RHEA**, Biology Department, West Texas State University, Canyon, Texas 79016. ●

STORERIA DEKAYI TEXANA (Texas Brown Snake). USA: TEXAS: Navarro Co: farm of C. J. Green off of Business Hwy 75, Corsicana. 26 October 1979 by Macon Edwards, Navarro College. Verified by Thomas Vance, Navarro College, Corsicana (NC 1979.10.26.1S). First record for Navarro County which partly fills the area between most of the surrounding counties (Raun and Gehlbach, 1972, Dallas Mus. Nat. Hist. Bull. 2:1-61). Specimen dehydrated but identifiable.

Submitted by **THOMAS VANCE** and **MACON EDWARDS**, Biology Department, Navarro College, Corsicana, Texas 75110. ●

THAMNOPHIS EQUES MEGALOPS (Mexican Garter Snake). USA: NEW MEXICO: Hidalgo Co: 8.3 km E of Virden in Gila River. July 1973. Kim Mello. Identified by A. H. Price. New Mexico State University (NMSU 5377). This specimen apparently is the second from the state and the first in this century (Conant, 1974, Symposium on the Biological Resources of the Chihuahuan Desert Region, United States and Mexico, Proceedings and Transactions of the National Park Service, No. 3, pp. 464 & 471). This species probably occurs throughout the Gila River and its tributaries in New Mexico wherever permanent water remains.

Submitted by **ANDREW H. PRICE**, Department of Biology, Box 3AF, New Mexico State University, Las Cruces, New Mexico 88003. ●

GEOGRAPHIC DISTRIBUTION OF TWO COLOR MUTANTS OF THE CORN SNAKE, *ELAPHE GUTTATA GUTTATA*

Elaphe guttata guttata ranges from southern New Jersey southward along the Coastal Plains through the Florida Keys, and westward to southern Louisiana. The range also includes the southern and eastern parts of Tennessee and disjunct populations in Kentucky (Conant, 1958).

Two color mutations have been reported in wild populations. Hensley (1959) described the first as complete albinism, referring to animals with red or pink eyes and without apparent melanin in body patterns. He also notes the melanin concentration varies, so definition of albinism has been left to individual interpretation. Since other pigments are present and a second color mutation has been identified, the snakes lacking melanin are more properly named amelanistic partial albino or amelanistic. The second color mutation involves the failure to produce the red and much of the yellow pigments, and should be referred to as an anerythristic partial albino or anerythristic. Both mutations, amelanistic partial albino (Bechtel and Bechtel, 1962) and anerythristic partial albino (Slemmer, 1973), have been bred in captivity and are inherited as autosomal recessives.

Elaphe g. guttata is a popular captive animal due to its docile disposition and its ability to thrive when given proper care. Since many herpetologists are breeding snakes to produce recessive color characteristics, there is always the chance that captive bred color mutants or carriers may enter the gene pool, thus altering their naturally occurring frequency. Therefore, a survey of mutant locations in the wild is significant. Furthermore, when this study was begun, all known anerythristic specimens were from one general area in Florida. One purpose of this survey was to find out if this was their sole locality.

Hensley (1959) assembled all known records of albinism reported in the literature and



Fig. 1. Known collecting sites for amelanistic partial albinos, *Elaphe g. guttata*.



Fig. 2. Known collecting sites for anerythristic partial albinos, *Elaphe g. guttata*.

those unpublished records up to that time. He listed four albino *Elaphe guttata* in his publication.

Mutant specimens were located by surveys of published material and collections as well as contacting individuals known to have collected them or who were aware of mutants in the field.

The collections surveyed were either located within the range of *Elaphe g. guttata* or were considered to be large and well-known enough to merit inclusion in this report. Thirty-one letters were sent to museums, universities, and colleges. Ninety per cent responded. To avoid false positive identifications of the anerythristic corn snake, a colored photograph of a live specimen was enclosed with the letter of inquiry. The following collections were inspected: Florida State Museum at Gainesville, Florida; Savannah Science Museum located in Savannah, Georgia; and Tall Timbers Research Station near Tallahassee, Florida. Also, Means (1978 personal communication) at Tall Timbers verified that no mutants were present in the Florida State University collection.

The geographic distribution of amelanistic mutants is shown in Fig. 1. The total number reported is ten; six from Florida, three from Tennessee, and one from North Carolina. Fig. 2 locates the anerythristic mutants. The total number reported is sixteen plus an unknown number of young. Two of these specimens are from Georgia and all others have been located in five contiguous counties in the southern tip of Florida.

The following represents data for the color mutant *Elaphe g. guttata* reported here.

Amelanistic partial albinos.

FLORIDA - Dade County, Hialeah. Gravid female caught in 1962 and two hatchlings had no melanin present. Specimen collected by Louis Porras, The Shed, 6932 N.W. 46th Street, Miami, Florida.

Franklin County, near Lanark. Specimen collected after being hit on highway U.S. Rt. 98 on 6 May 1972. Reported by D. Bruce Means, Tall Timbers Research Station, Tallahassee, Florida.

Marion County, Silver Springs. Reported by Hensley (1959).

Monroe County, Key West. Specimen brought to Miami Serpentarium. Reported by Louis Porras.

Sarasota County, outskirts of Myakka State Park. Collected July 1973 by Richard Bartlett, 146 North Brook Road, Springfield, Massachusetts.

NORTH CAROLINA - Stanly County, near Albemarle. Reported by Hensley (1959).

TENNESSEE - Obion County, Reelfoot Lake. Two juvenile specimens reported by Hensley (1959).

Shelby County, outside Memphis. Specimen collected in 1973 and reported by Louis Porras.

Anerythristic partial albinos.

FLORIDA - Collier County, south of Immokalee. Specimen collected on Rt. 858 on 6 January 1973 by Bob Wallen, 11324 Snowfall court, Tampa, Florida.

Dade County, west of Homestead. Collected about 1958. Reported by Louis Porras.

Dade County, 35 miles west of Miami. Collected in summer of 1968. Reported by Louis Porras.

Dade County, Homestead. Collected in 1973. Reported by Louis Porras.

Dade County, 15 miles northwest of Homestead. Collected in summer of 1977. Reported by Louis Porras.

Dade County, Rt. 27 at entrance to Everglades National Park. Collected by Joe Granado, 5509 SW Second Street, Miami, Florida.

Hendry County. Collected in fall of 1976 by John Rindfleish, Box 172, Palm Beach, Florida.

Hendry County. Specimen collected 10 January 1978 by Dick Flood, Okefenokee National Wildlife Refuge, Waycross, Georgia.

Hendry County, south to southwest of Clewiston. Three specimens purchased from Thompson Zoo in Clewiston by Louis Porras.

Hendry County, near Devil's Garden. Gravid female had unknown number of young without red pigment. Collected by Louis Porras.

Lee County, Tice. Specimen collected 2 June 1969, (Florida State Museum, 29082). Collected by John Martins.

Palm Beach County. Two specimens collected in 1977 by Louis Porras.

GEORGIA - Chatham County. Adult male collected July 1978. Reported by Bobby Mullis, Savannah Science Museum, Savannah, Georgia. Collected by Tom Roe.

Effingham County, Meldrim Road 0.2 miles north of Chatham County line. Collected by Charles S. Willis, 13 March 1977. Adult male, DOR (Savannah Science Museum, 77.5482).

One can only speculate why more aberrant *Elaphe g. guttata* have been reported from Florida. It may be due to more intense collecting, a year-round collecting period, available resources for identification, a higher incidence within the gene pool, or a combination of some of these. The scarcity of anerythristic specimens reported outside of Florida may be due to misidentification of this abnormality. Immature *Elaphe obsoleta* occurring throughout most of the range may be confused with this mutant.

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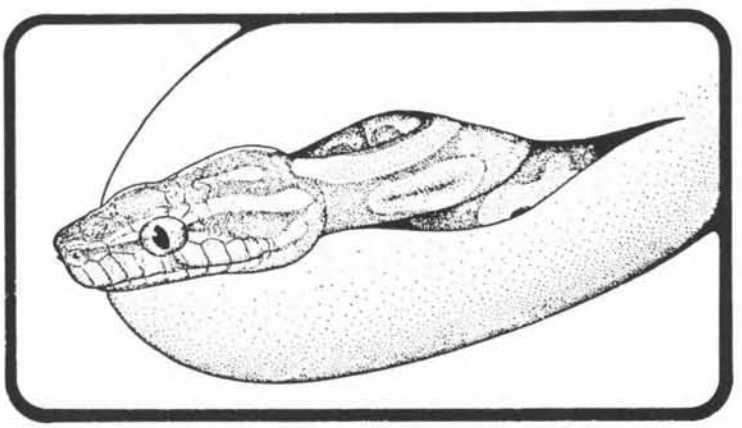
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LOCALITY RECORDS OF *RHINOCHEILUS LECONTEI* IN THE UNITED STATES AND MEXICO

The locality records reported below include all records available at the time of publication of the species account for *Rhinocheilus lecontei* (Medica, 1975). Additional records include fossil localities in Texas (Rogers, 1976); New Mexico (Van Devender and Worthington, 1978); Arizona (Van Devender et al., 1977); Arizona and California (Van Devender and Mead, 1978); and Nevada (Van Devender, pers. comm.). Additional published county and state records include: Kansas (Collins and Caldwell, 1976); Texas (Hambrick, 1975; Karges, 1978; Mather and Dixon, 1976); Oklahoma (Mather, 1978); and Zacatecas, Mexico (Frost, 1978). All the above recent records are included in the list below in addition to numerous unpublished county records for which specimens are presently in collections whose records were made available to me.

Rhinocheilus lecontei has been recorded in the following states and counties in the United States and Mexico: *ARIZONA*: Cochise, Gila, Graham, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma; *CALIFORNIA*: Alameda, Fresno, Imperial, Inyo, Kern, Kings, Lassen, Los Angeles, Madera, Orange, Riverside, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Stanislaus, Sutter, Tulare; *COLORADO:* Baca, Powers; *IDAHO*: Elmore; *KANSAS*: Barber, Clark, Comanche, Ford, Hamilton, Harper, Meade, Morton, Seward, Stanton; *NEW MEXICO*: Bernalillo, Chaves, De Baca, Dona Ana, Eddy, Grant, Guadalupe, Harding, Hidalgo, Lea, Lincoln, Luna, Otero, Quay, Roosevelt, Sandoval, San Miguel, Sierra, Socorro, Valencia; *NEVADA*: Churchill, Clark, Elko, Esmeralda, Lincoln, Mineral, Nye, Washoe; *OKLAHOMA:* Alfalfa, Beaver, Blaine, Comanche, Custer, Dewey, Grandy, Greer, Harmon, Harper, Jackson, Love, Woods, Woodward; *TEXAS:* Andrews, Archer, Armstrong, Atascosa, Baylor, Bee, Bell, Bexar, Borden, Bosque, Brewster, Briscoa, Brooks, Brown, Burnet, Callahan, Cameron, Childress, Clay, Cochran, Coke, Colesman, Collingsworth, Comal, Comanche, Concho, Coryell, Cottle, Crane, Crockett, Crosby, Culberson, De Witt, Dickens, Dimmit, Duval, Eastland, Ector, Edwards, El Paso, Erath, Foard, Gaines, Garza, Gillespie, Gonzales, Hamilton, Hardeman, Hartley, Haskell, Hays, Hemphill Hidalgo, Hood, Howard, Hudspeth, Hutchinson, Irion, Jack, Jeff Davis, Jim Wells, Jones, Karnes, Kent, Kimble, King, Kleberg, Knox, Lampasas, La Salle, Live Oak, Llano, Lubbock, Lynn, Martin, Mason, Maverick, McCulloch, McLennan, McMullen, Medina, Menard, Midland, Mills, Mitchell, Montague, Motley, Nueces, Ochiltree, Palo Pinto, Parker, Pecos, Presidio, Randall, Reeves, Runnels, San Patricio, San Saba, Scurry, Shackelford, Starr, Stephens, Stonewall, Sutton, Tarrant, Taylor, Terrell, Throckmorton, Tom Green, Travis, Uvalde, Val Verde, Ward, Webb, Wheeler, Wichita, Wilbarger, Williamson, Wilson, Winkler, Wise, Young, Zavala; *UTAH*: Beaver, Carbon, Juab, Kane, Millard, Tooele, Washington; *MEXICO*: Baja California Norte; Baja California Sur (Cerralvo Island); Chihauhua; Coahuila; Durango; Jalisco (exact locality unknown); Nayarit; Nuevo Leon; San Luis Potosi; Sinaloa; Sonora; Tamaulipas; Zacatecas.

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ENYALIOSAURUS QUINQUECARINATUS (GRAY) AND *LEPTODEIRA NIGROFASCIATA* GÜNTHER IN EL SALVADOR

Recent herpetological work in El Salvador, in connection with the preparation of treatments of the lizards and snakes of the country, has demonstrated the presence of two species new to the herpetofauna of El Salvador. These additions are discussed below.

ENYALIOSAURUS QUINQUECARINATUS (GRAY)

The distribution of *Enyaliosaurus quinquecarinatus* is disjunct, with isolated populations having been recorded from the Isthmus of Tehuantepec, Oaxaca, Mexico (Bailey

1928), Honduras (Günther, 1885; Meyer and Wilson, 1973) and Nicaragua (Villa and Scott, 1967).

Several specimens are now available from El Salvador. The localities from which this lizard has been collected are: No specific locality (DBUES 64); Loma El Salamar, Cantón Calavera, Cacaopera, 6 Km SE Corinto, Depto. Morazán (MHNES 361); Cantón La Joya, 3 ½ Km W Tejutepeque, Depto. Cabañas (NH 235, 244-248). These localities are below 800 m in the Subtropical Dry Forest formations of Holdridge (1975). The vegetation at these localities consists primarily of *Curatella americana* and *Karwinskia calderoni*. The soil abounds with stones.

The Salvadorean specimens agree well with Gray's (1842) original description of *E. quinquecarinatus* and also with that given by Bailey (1928). The specimens lack a dewlap and have a strong transverse gular fold. Supralabials vary from 7 to 10; infralabials, from 6 to 10. The suprabrachials scales are smooth and the central row of caudal spines is equal in size to the lateral series, usually 9 enlarged dorsal scales on the 4th caudal whorl. The middorsal crest is low, extending to or near to the sacrum. Number of dorsal scales in midline 40 to 84 (average 65). Femoral pores vary from 6-5 to 9-8.

Males range from 126 to 169 mm (152 mm) in snout-vent length and from 318 to 385 mm (350 mm) in total length; females, from 83 to 112 mm (100 mm) in snout-vent length and from 195 to 250 mm (226 mm) in total length. The smallest juvenile, a female, has a snout-vent length of 83 mm and a total length of 195 mm.

The color of the adults in life was as follows: ground color gray; dorsum of head olive gray; usually with whitish-gray, black or orange dots; body with brown or black crossbands, narrowing laterally, and extending onto venter, where they almost meet midventrally (in some specimens these bands may be more or less fused dorsolaterally, but usually remain distinct middorsally and laterally); interspaces between crossbands olive yellow to olive green dorsally; body flecked with whitish-gray between the crossbands laterally; dorsum of tail with olive yellow to olive gray crossbands alternating with dark brown ones; limbs with irregular transverse dark brown to black bands, flecked with olive green to whitish-gray dorsally (in some specimens the upper surfaces of the limbs are completely black with whitish gray flecks); chin and throat with dark brown to black spots or blotches; gular region and chest olive green to yellow green (in some individuals the gular region is spotted or black); venter gray; undersides of limbs with dark brown to black flecks.

The color of the juveniles in life was as follows: ground color olive gray; dorsum of head olive green, faintly spotted with dark brown; body with conspicuous narrow, dark brown crossbands, sometimes discontinuous laterally but extending onto venter as a row of spots; olive green middorsally between the bands; upper surfaces of limbs with dark brown to black blotches or with conspicuous transverse black bands; chin, throat, and gular region olive gray to whitish-gray, with longitudinal blackish streaks; underside of limbs with black spots.

Villa and Scott (1967) indicated that these lizards have arboreal habits. However, in El Salvador they seem to be primarily terrestrial, climbing in trees occasionally to forage for food. I have found both juveniles and adults under small, flat rocks, slabs of limestone and in loose rock fences.

The juvenile of *E. quinquecarinatus* from Nicaragua discussed by Villa and Scott (1967) had a bright green dorsal ground color, which becomes duller later in life. The color thus differs from that of juveniles from El Salvador. Perhaps the duller color of the Salvadorean juveniles adapts them better to the rocky environments they inhabit in El Salvador.

LEPTODEIRA NIGROFASCIATA GÜNTHER

Duellman (1958) recorded the range of *Leptodeira nigrofasciata* as comprising the Pacific lowlands from Guerrero, Mexico south through Guatemala, Hounduras, and Nicaragua to Costa Rica. A single specimen is now available from El Salvador. The locality is km 56 on the road to La Libertad, between Mizata and Bocana La Perla, 10 m, Depto. La Libertad. The specimen came from an area that was originally in the Subtropical Moist Forest formation of Holdridge (1975); presently there are only relicts remaining of this forest.

The Salvadorean specimen (MHNES 488) is a male with the following characteristics: ventrals, 175; anal plate divided; subcaudals, 75; dorsal scales smooth; dorsal scale reduction formula

$$19\ \frac{8+9(125)}{8+9(127)}$$

17 (175); supralabials 8-8, with 4th and 5th entering orbit; infralabials 10-10; loreal single; preoculars 2-2; postoculars 1-1; temporals 1+2+3; total length, 517 mm; tail length 130 mm.

The color in life was as follows: dorsal ground color cream, with 17 dark brown blotches, extending laterally onto the tips of the ventrals; interspaces greenish cream, varying from one to four scales in length; first interspace creamy white, straight-edged, extending three scales behind parietals; no intercalary spots; tail with 10 transverse dark brown bands; venter cream; dorsum and sides of head dark brown; chin and throat grayish brown; chin shields spotted with dark brown medially.

The above description agrees well with that given by Duellman (1958), except that he gave the range in total length in males as from 202-486 mm; the specimen herein reported exceeds the upper end of this range by 87 mm.

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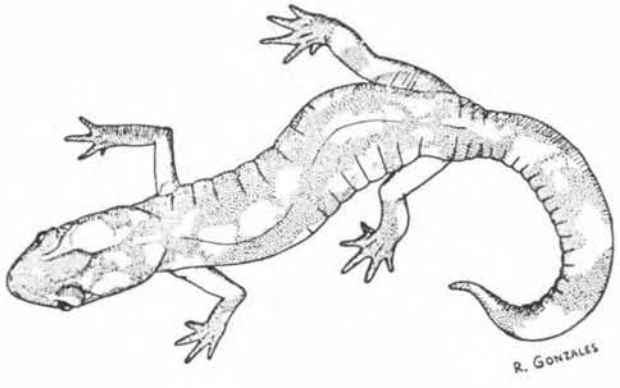
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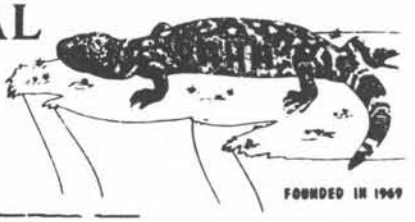
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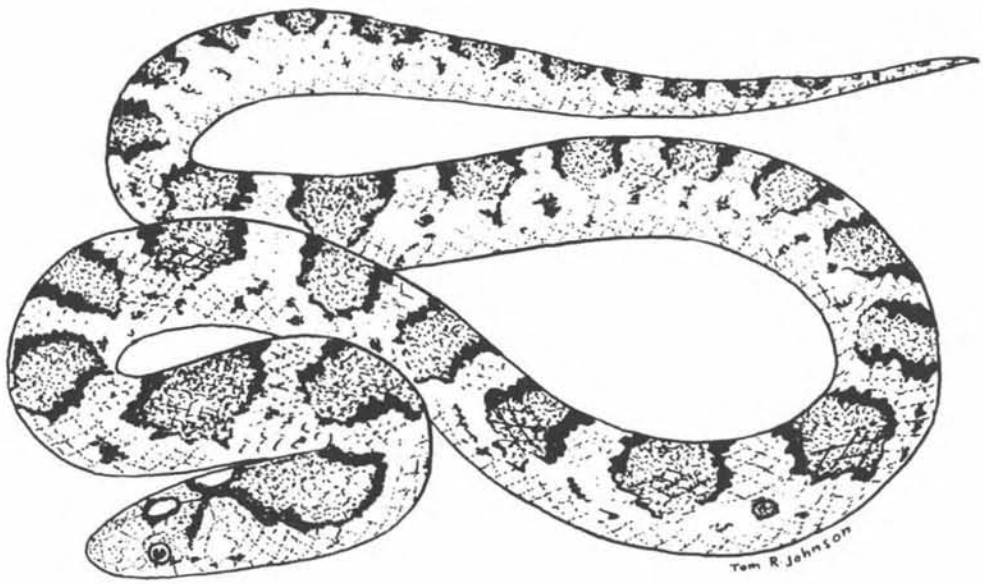
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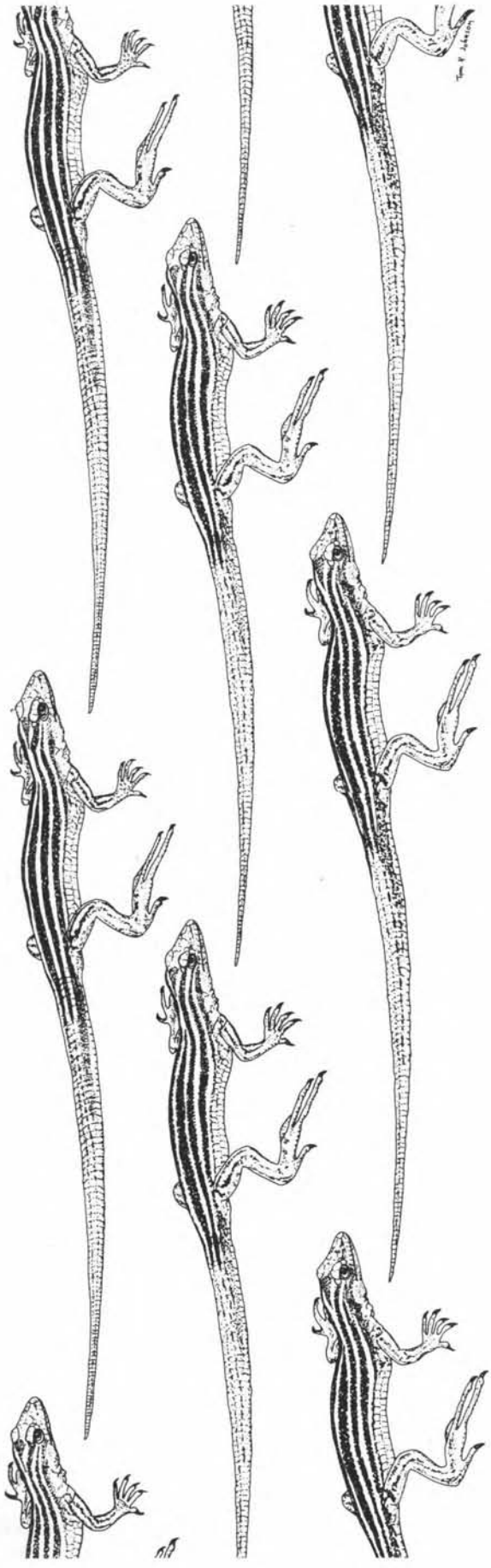
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Contents

SSAR BUSINESS

1980 Annual Meeting Dates 2
SSAR Contributors 2

FEATURE ARTICLES

"SIOP"—A new non-venomous snake, by Morris K. Jackson 2
"SIOP"—Reply to Jackson commentary, by Terry Trudeau 3
A shelled egg in the cloacal bursa of a turtle, *Kachuga tectum tectum*, by P. L. Duda and V. J. Gupta 4
Field methods for sampling the dietary components of Green Turtles *Chelonia mydas*, by George H. Balzs 5
Edwin James's report on *Bipes* reconsidered, by J. Howard Campbell 6

REGIONAL SOCIETY NEWS

Regional herpetological publications find permanent home 7
Regional herpetological societies: a perspective, by John C. Murphy 7

LEGISLATIVE ALERT

Letter from Hugh Quinn to FDA 9

HERPETOLOGICAL HUSBANDRY

Equating food amount for laboratory reared turtles, by Richard Stout 9
Coprophagy in *Thamnophis s. sirtalis*, by Karl H. Peterson 9
The reproductive biology of *Bombina orientalis*, with notes on care, by J. T. Carlson and M. S. Ellinger 11

NEWSNOTES 12

GEOGRAPHIC DISTRIBUTION

New records 13
Distribution of the tailed frog, *Ascaphus truei* Stejneger, in several drainages in northcentral Idaho, by O. E. Maughan, et al. 15
Notes on the occurrence of introduced turtles in Arizona, by Arthur C. Hulse 16

CURRENT LITERATURE 17

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"SIOP"—A NEW NON-VENOMOUS POISON SNAKE

"Over 700,000 children swallow poisonous substances each year. Most children who swallow poisons are under 5 years of age"—thus reads some of the poison facts by HAPPY, an organization from Normal, Illinois, which is attempting to eliminate accidental poisoning in children. Working with over 15 poison control centers in the midwest and south, HAPPY is marketing products which are designed to educate adults and children about the dangers of poisonous substances such as medicines, plants, insect spray poisons, household cleaning agents, gasoline and petroleum products, paint and polishes, cosmetics, and strong chemicals. Most Americans would generously accolade any organization designed to reduce or eliminate accidental poisonings, so why should herpetologists be expressly interested in the workings of this organization?

Herpetologists, as well as other conservationists, should be aware that a new and psychologically tested motif which symbolizes danger and poison is a caricature of a snake. The snake, named "Siop," is the trademark of the HAPPY poison prevention campaign. No—Siop means "poison" spelled backwards. The snake is definitely not a friendly-looking creature. The snake is coiled twice and has an upraised and disproportionally large head with large ominous eyes and round pupils. The face has a frowning mouth with two exposed, long, closely adjacent fangs. An additional design which resembles the pointed ends of two men's neckties placed side by side, appears on the snake's forehead and accentuates the downward pointing and fierceness of the fangs. Siop is colored green and appears in the center of an orange circle surrounded by a black ring. Emergency phone numbers and the name of the sponsoring poison control center appear within the black ring. The sclera of the eyes and the fangs are white. Interestingly, except for the fangs, the characteristics that most herpetologists might recognize to be indicative of a potential poisonous snake are not presented. For example, the tip of the tail is exposed but bears no rattle, the pupils are round and not elliptical, facial pits are not present, the head is not triangular, and color patterns (red, yellow, black rings) are not present.

Siop thus apparently is not a venomous North American snake. Why then was he chosen for this despicable position? The answer is not obvious. First of all, Siop was not designed to warn the individuals about the danger of venomous snakes. Rather Siop was designed to be used as a "symbol" to indicate a potentially dangerous substance. Thousands and thousands of Siop the "symbol" stick-on labels have been distributed to hospitals, schools, nursing homes, and community organizations. His presence on medicine bottles, rat poison, lye soaps, and other household items is preventing poisoning in both children and adults. Secondly, the Siop symbol and colors were chosen by psychological testing in competition with old and new symbols. For example, Siop was more effective in creating an adverse reaction in children than the old skull and crossbones symbol. Commercialism has made the familiar skull and crossbones just that—too familiar, and it now signals "pirates and fun" to many youngsters. The symbols used by other poison control centers have also recently suffered from commercialism. For instance, Mr. Yuk is the poison symbol created by the Children's Hospital of Pittsburgh and used by its network of poison control centers. Mr. Yuk is a round green circle which represents a face. The face has frowning closed eyes and a frowning mouth with a protruding tongue extending downwards. His expression descriptively fits the slang work "Yuk!" Unfortunately, the overuse of similar designs exhibiting a smiling face with captions reading "have a happy day" or a frowning face reading "hope you feel better soon" are probably having a negative impact upon the effectiveness of Mr. Yuk. Third, Siop also is less expensive to use. Strong copyright and other technical contracts which are designed to reduce the unauthorized use of such poison logos often add considerable expense to most poison control programs. In summary, Siop was chosen because it is a psychologically ominous symbol which is easy to recognize, less expensive, and less familiar commercially.

Most ophiologists, on the other hand, become quite ired at the use of a snake, symbol or not, which is designed to create an adverse and negative reaction about snakes. The reinforcement of negative thoughts and false conceptualizations about snakes, we fear, might create animosity towards an already overhated creature. We argue that Siop might establish a new generation of hardened snake-phobes in the future and likewise stir the "dragons of Eden" (Carl Sagan,

Ballantine Books) within adults today. Most of us would like for the American public to think of the snake as the two entwined serpents on the staff of the caduceus—the symbol of healing and the physician, instead of Siop the poison bearer. Can we afford to overlook another onslaught (however subtle) against the snake, even though Siop was never intended to be a snake? Conversely, Siop is very effective in his role and many parents are grateful. Can we afford not to have a Siop?

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Dear Dr. Pisani:

Dr. Jackson has presented a knowledgeable argument on use of an alternate symbol to suggest danger, and the advantages when the figure is manually applied to a poisonous substance. I would like to comment further on the development of the SIOP Program and present the findings of a study we conducted to test childhood attitudes toward snakes as related to the Program.

As Dr. Jackson pointed out, SIOP is not a real snake, but rather a characterized snake-like drawing designed and tested by Masters degree candidates in Design and Psychology at Illinois State University, Normal, Illinois.[1,2] The snake was chosen among many animals due to its world-wide distribution, making it easily recognizable by even the youngest children in most countries. The SIOP figure is a construction of shapes chosen as most basic through perception studies in children.[3,4] Green was chosen because it has been shown to be the color most repulsive to our target age group (I-5 year olds).[5,6,7] The color orange focuses the child's eyes on the symbol, thus competing successfully with the graphics on the poison label.

During the educational portion of the program, the children are taught to selectively identify and avoid the character SIOP when it is attached to a product. The same selective approach is used when teaching children or adults to avoid other dangerous animals, plants, etc. By identifying unique characteristics, an individual is taught to avoid certain species of an animal or plant without condemning the entire order.

The SIOP symbol is meant to be used only in conjunction with the other materials of the poison prevention program. Parents must actively teach their children to avoid poisonous containers to which SIOP has been applied. Parents must also learn and practice our other safety rules (i.e., use only childproof caps) to avoid the senseless tragedy associated with childhood poisoning.

Recently, in Springfield, Illinois, an attitudinal study was conducted to test whether the SIOP Program negatively influenced childhood conception of snakes. The sample for this study was made up of 90 three and four year old children from four different nursery school classrooms. Two of the classrooms were used as an experimental group and two as the control, with 45 children in each group.

The pretest and posttest consisted of a 16 item questionnaire (Figure I). The first two questions helped establish rapport between the child and the experimenter and also helped to introduce the subject matter to the child. An explanation for question two enabled the experimenter to determine an encounter with a live or fictional snake. Questions three through nine related to the child's attitudes toward snakes and were noted with yes or no answers. Questions 10, 11 and 12 pertained particularly to the Siop Program. Questions 12 through 16 involved showing the child black and white drawings of snakes: (12) Siop, (13) crawling coral snake, (14) "fanged" rattle snake, (15) coiled western racer, and (16) coiled, fanged rattle snake.

The educational program involved a three day presentation, involving 15 to 30 minutes of instruction and activities per day. Materials used during the first day included two puppets (Happy and Siop), five household products (3 poisonous and 2 nonpoisonous), and a bulletin board illustrating numerous household products. The second day's lesson included an activity book for each child and five flash cards of three poisonous and two nonpoisonous products. The third day's lesson was supplemented with an antidote chart, a guide to poisonous plants, home safety check list, Siop warning labels, and a parent-teacher guide for each child to take home.

Procedures for the study were as follows:

1. **Pretest.** Each child was taken individually into a room away from the other children. The experimenter asked the child's name and age, and then gave the following explanation: "I'm going to ask you some questions I'd like you to answer for me." The experimenter then proceeded to ask the questions, noting responses. After question 11, the experimenter stated, "Now we are going to look at some pictures." The experimenter then showed the child the pictures, one at a time. After showing each picture, the experimenter asked, "Do you think this is a picture of a snake?" If the child's response was "yes" the experimenter asked, "Is this a good snake or a bad snake? Why?" If the child's response was "no" the experimenter then asked, "What do you think this is?" and noted the response in the space provided on the questionnaire.
2. **Educational Program.** The educational program was administered in two of the four classrooms three to five days after the pretest.
3. **Posttest.** The posttest was administered exactly as the pretest three weeks after the pretest in both the experimental and the control groups.
4. **Scoring.** One point was given for the following: A "no" answer for questions 3, 6, 7, and 9. A "yes" answer for questions 4, 5, and 8. "Good" as an answer for questions 13, 14, 15, and 16. The pretest scores were subtracted from the posttest scores and the resulting difference scores were used in the data analysis.

The study was set up in a simple randomized design. A t ratio was computed on the pretest - posttest difference score. Significance was set at the .01 level.

The results from the analysis of data suggest that there was no significant difference between the groups tested. The mean difference score for the experimental group was .40 and for the control was .47. No significant difference between the two group means was established ($t = .0256$).

The data collected in the study indicated that the SIOP Program has no significant effect on a child's attitudes toward snakes. Neither does the program have a significant effect on their conception of good and bad snakes.

As discussed, the SIOP Poison Prevention Research and Education Program is based on thorough research and creates no negative childhood attitudes toward snakes. The pro-

PRETEST POSTTEST E C

NAME_____ SCHOOL_____

AGE_____ DATE_____

I'm going to ask you some questions I'd like you to answer for me.

1. Do you know what a snake is?	Y	N	NR
2. Have you ever seen a snake?	Y	N	NR
Explain_____			
3. Are you afraid of snakes?	Y	N	NR
4. If you saw a snake would you pick it up?	Y	N	NR
5. If you saw a snake would you stand and watch it?	Y	N	NR
6. If you saw a snake would you run away from it?	Y	N	NR
7. If you saw a snake would you try to kill it?	Y	N	NR
8. Do you think there are any good snakes?	Y	N	NR
9. Do you think there are any bad snakes?	Y	N	NR
10. If you saw a good snake right there (indicating the near floor) would you pick it up or stay away from it?	Y	N	NR
11. If you saw a bad snake right there (indicating the near floor) would you pick it up or stay away from it?	Y	N	NR

Now we are going to look at some pictures. Do you think this is a picture of a snake? (If yes) Do you think this is a good snake or a bad snake? Why? (If no) What do you think this is?

12.	Y	G	B	_____	N	_____
13.	Y	G	B	_____	N	_____
14.	Y	G	B	_____	N	_____
15.	Y	G	B	_____	N	_____
16.	Y	G	B	_____	N	_____

gram has been proven effective due to the dramatic reduction of accidental poisonings in those communities where the program has been implemented.

To the Poison Control Center Staff at Brokaw, the answer to Dr. Jackson's final questions is readily evident. Where the health and welfare of our children is involved, we can ill afford not to have a SIOP.

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A SHELLED EGG IN THE CLOACAL BURSA OF A TURTLE *KACHUGA TECTUM TECTUM*

Presence of shelled eggs in the body cavity of turtles has been occasionally reported (Cagle, 1944, *Copeia*. p. 60; Cagle and Tihen, 1948, *Copeia*. p. 61; Duda and Gupta, 1978, *Herpetol. Rev.* 9(2):46; Risley, 1933, *Papers. Mich. Acad. Sci.*, Arts & Letters *17*:685-711) but their occurrence at other abnormal sites within the body of a turtle has been reported only once before (Dobie, 1968, *Herpetologica, 24*(4):328-330).

On 22 April 1977, a fresh water turtle, *Kachuga tectum tectum* was dissected for routine gonadal studies. Upon opening the turtle, a shelled egg was found lying inside its highly distended right cloacal bursa (Fig. 1). The ovaries looked spent and showed the presence of 11 ruptured follicles (7 right: 4 left) all of which were at nearly the same stage of differentiation into corpora lutea. The oviducts were fully developed but did not contain any eggs. The turtle had been captured four days earlier from a slow running stream 18 KM southwest of Jammu City (J. K. State, India). In its weight and measurements (weight 603 gm; carapace 182 x 170 mm; plastron 157 x 137 mm) and external and internal features, the turtle seemed a healthy and normal female.



Figure 1.

In view of the number of ruptured follicles in the two ovaries, the turtle had obviously ovulated 11 eggs but laid only 10, the 11th being apparently the one that had pushed its way into the cloacal bursa. The ill-fated egg was 38 mm in its longest axis and 21 mm in its maximum girth, in which dimensions it compared favourably with normal eggs (size range 23-45 x 15-30 mm) of the species. Additionally, a lot of fecal matter was seen to have nearly completely filled the urinary bladder and partially filled the cloacal bursa containing the egg. The left side cloacal bursa was in a collapsed state and was empty.

Dobie (*op. cit.*) attributed the abnormal placement of eggs in the urinary bladder to some carapaceal deformity and consequent crowding of reproductive structures in *Macroclemys temnicki*. In our specimen of *Kachuga t. tectum*, on the contrary, the carapace and arrangement of internal viscera were normal and hence could not have contributed to the abnormal movement of the egg into the cloacal bursa. Moreover, Dobie's speculation that "simultaneous movement of two eggs from opposite oviducts into the cloaca could have forced one egg . . . into the urinary bladder," and the presumption that "the unusual events . . . occurred twice, probably in similar fashion" to explain the occurrence of two shelled eggs in the urinary bladder in his turtle seem highly improbable.

Thus in view of what has been said above, the presence of shelled eggs in such unorthodox situations as reported appears to be purely accidental unless there is some morphological evidence to support an alternative. Presence of fecal matter in the urinary bladder and the cloacal bursa could be an outcome of a likely blockade in the cloacal passage created by the awkward position of the egg inside the distended bursa.

The specimen used in this study is in the collection of the Museum of the Department of Bio-Sciences, University of Jammu under catalogue No. JUBR-49.

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FIELD METHODS FOR SAMPLING THE DIETARY COMPONENTS OF GREEN TURTLES *CHELONIA MYDAS*

The dietary components of *Chelonia* and other genera of sea turtles have not been adequately defined for most populations. While green turtles are known to be predominantly herbivorous, only limited information exists on the types of marine flora seasonally utilized by different age-groups at the geographically separated feeding pastures. Hirth (1971) summarized the published knowledge of the food of green turtles. Except for first-hand observations of turtles actively feeding, these determinations are based exclusively on analyses of stomach contents obtained from dead specimens that were either taken directly by fishermen and researchers, or salvaged after mortality resulting from other causes. The endangered status of most sea turtle populations presently imposes constraints on the direct and permanent collection of individuals for food determinations, unless such research is carried out incidental to existing turtle fisheries. Even then, an inherent limitation of this method is that it only allows for the sampling of an individual once. Stomach contents removed from stranded or other turtles found under aberrant circumstances have the additional disadvantage of possibly not being representative of the food sources normally utilized. When turtles are observed directly from shore, it is usually difficult to actually view what transpires beneath the surface where feeding takes place. The use of scuba for underwater observations has also been generally unsatisfactory due to the disturbance caused to natural behavior. Problems associated with the unobscured viewing of turtles feeding in the wild may, however, eventually be overcome through the use of closed-circuit underwater TV cameras positioned at strategic sites.

The need for further investigations of the food of all sea turtles in their respective regions has recently been emphasized by Schulz (1975). In the Hawaiian Islands (18°55'N, 154°49'W to 28°15'N, 178°20'W), life history research of the *Chelonia* has focused on aggregations of turtles in inshore feeding pastures throughout the 2,600 kilometer Archipelago, and non-injurious methods have been developed for field sampling of dietary components. The objective of this paper is to describe these techniques so that they may be used on *Chelonia* in other areas, and tested for effectiveness on the other genera of sea turtles. Although the methods employed are relatively simple, they have not been previously described for use on sea turtles.

Sampling Methods

Samplings of dietary components are carried out on green turtles that have been captured alive by one of the following techniques: 1) grasping the animals underwater by hand with the aid of scuba; 2) restraining the animals with long-handled scoop nets used from shore or from a small boat; 3) entangling the animals in large mesh nets set at regularly frequented sites. In each case, precautions are taken to prevent injury or undue stress.

After capture, a turtle is placed on its back with the mouth maintained in an open position by inserting a semirigid object between the upper and lower jaws on one side. A flexible plastic measuring tape folded to the appropriate dimension has been found suitable for such purposes. The mouth is then inspected visually for the presence of food material. If the turtle has been feeding immediately prior to capture and removal from the water, such material will frequently be present in relatively large quantities and can be easily removed. This retention of food in the mouth appears to be due to the inability of green turtles to swallow while out of water. Even when feeding has not been taking place, small particles of identifiable food may still be found adhering to the horny palate.

Following an inspection of the mouth, the stomach contents are sampled by inserting a flexible plastic tube through the esophagus into the stomach with subsequent moderate aspiration, either orally or with a syringe. For turtles 35 to 55 cm in straight carapace length, a tube with an outside diameter of 8 mm has been found suitable. For turtles over 55 cm, an outside tube diameter of 12 mm can be used. Insertion of the tube can be facilitated by lubrication with vegetable oil, and by placing a piece of electrical wire inside the tube to make it more rigid. This wire core is then withdrawn after the tube has reached the stomach. Once the tube is in position, retrieval of a sample can be enhanced by introducing a small quantity of sea water into the stomach before aspiration. It should be noted that difficulties with the insertion of the tube are more likely to be encountered with turtles larger than 70 cm. An earlier stomach sampling procedure for Hawaiian *Chelonia* employed the use of retractable forceps controlled through a small diameter flexible shaft (Balazs, unpublished). While this technique proved effective in many cases, greater success and efficiency has been achieved using the plastic tube. A method of determining the dietary components of crocodilians which also incorporates a plastic tube to sample stomach contents has been described by Taylor and Webb (1978).

A third method of sampling involves the examination of fecal pellets found washed ashore along the coastline bordering certain feeding pastures. Specific identifications have been made of benthic algae and, at times, invertebrates recovered in a relatively undigested state from such feces. Samples of the stomach contents of turtles captured in the same feeding pasture have closely resembled those obtained from the fecal pellets. This inefficient digestion in green turtles has not been previously reported and further investigations are being conducted of its scope and significance.

Discussion

Of the three methods described, recoveries of food samples from the mouth and the stomach have proven to be the most valuable. This is due to the fact that samples are derived from turtles of known size that can be identified by tagging and, therefore, are available for recapture and resampling at a future date. Individual recognition is not possible from fecal pellets, and only an estimation of the turtle's size can be made by measuring the diameter of the fecal pellet. The preliminary results of research on Hawaiian *Chelonia* using mouth and stomach sampling methods have recently been presented (Balazs, 1979).

Post-mortem examinations conducted on green turtles of different sizes salvaged from Hawaiian waters have indicated that the stomach is comprised of two separate compartments. The differentiation of these areas appears to become more pronounced as the size of the turtle increases. Use of the sampling tube results in the retrieval of food material from the first compartment. As in the esophagus, numerous soft papillae are located on the mucosa of this gastric area.

Green turtles basking ashore in the remote Northwestern Hawaiian Islands have on

occasion been observed to regurgitate into their mouth and subsequently reswallow the material. It is unknown, however, if this is due to a vomiting reflex or simply represents compression of the stomach caused by upward movement of the plastron from resting on land. The artificial induction of vomiting through the use of noninjurious drugs is well known for some animals (Borison and Wang, 1953). If green turtles are able to vomit, the development of such an emetic could provide an additional effective method for field sampling of dietary components.

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EDWIN JAMES'S REPORT ON *BIPES* RECONSIDERED

About forty years ago the well-known herpetologist Edward H. Taylor (1938) expressed his conviction that a species of *Bipes* occurs in southeastern Arizona, at least in the Huachuca and Santa Catalina mountains. This opinion was based on oral reports made to him by a number of local people, none of whom were herpetologists. So far, Taylor's surmise has apparently never been verified, although Hobart M. Smith (1946) gave the suspected animal a tentative common name (Arizona worm lizard) and even tentatively mapped its probable range. Later on, Smith and Taylor (1950) went so far as to state flatly, without reservations, that the genus *Bipes* occurs in southeastern Arizona. This was a remarkable procedure considering the total lack of specimens from anywhere near Arizona in known herpetological collections, and the fact that no herpetologists claimed to have seen the animal in the field.

It seems even more remarkable in view of Taylor's summary dismissal, in his 1938 paper, of Edwin James's circumstantial account of bipes-like creatures observed and collected on June 27, 1820, in the South Platte Valley of present-day Nebraska or Colorado during Major S. H. Long's Expedition to the Rocky Mountains (James, 1823). The locality was probably on the south side of the South Platte River somewhere between the modern towns of Ogallala, Nebraska, and Julesburg, Colorado. In James's account we read: "We observed, in repeated instances, several individuals of a singular genus of reptiles (chirotes, Cuv.) which in form resemble short serpents, but are more closely allied to the lizards, by being furnished with two feet. They were so active, that it was not without some difficulty that we succeeded in obtaining a specimen. Of this (as was our uniform custom when any apparently new animal was presented) we immediately drew out a description. But as the specimen was unfortunately lost, and the description formed part of the zoological notes and observations which were carried off by our deserters, we are reduced to the necessity of merely indicating the probability of the existence of the chirotes lumbricoides of naturalists, within the territory of the United States."

The deliberate use of the old name "chirotes" in this account makes it virtually certain that an animal like that now known as *Bipes* was meant, and that the "two feet" were in front, not behind. We should keep in mind that we are here dealing with an account prepared by competent naturalists, not by laymen in the subject. Nevertheless, in his 1938 paper, Taylor states that this report "... has been given little credence. One wonders upon what animal such a report was based, or whether the account is fictitious." He cites Harlan (1827) to support his view that James's account was (and evidently ought to be) given little credence, but it appears to me that Harlan's remarks can just as well be interpreted to mean that he (Harlan) had made an oversight, in the absence of specimens, in not mentioning the *Chirotes* report in his original 1826 paper on the genera of North American reptiles. What Harlan said in 1827 was as follows: "In the Methodical Table of the North American Reptilia [*i.e.*, in is 1826 paper], we have omitted to notice a species of Chirotes, the existence of which in this country is indicated in Major Long's Expedition to the Rocky Mountains, vol. 1, p. 484." What exact meaning Harlan meant to convey must be left to the interpretation of the individual reader.

I do not think that James's account of *Chirotes* in the South Platte Valley in 1820 deserved the cavalier treatment which Taylor accorded it, and certainly not to the point of impugning the scientific integrity of Edwin James and his fellow scientists of Long's Expedition by raising the suspicion that the whole thing was "fictitious," as if they had perpetrated a hoax and palmed it off as genuine. The zoologist of the expedition was Thomas Say, who is known to have collaborated with James on the comprehensive report on Long's Expedition and who himself wrote most if not all of the zoological sections, even though his name does not appear on the title page as an author. Although Say is primarily remembered as an entomologist, he was also a very good general zoologist with competency in several vertebrate groups, including the Reptilia. His main interests in zoology were taxonomic, and as a matter of fact he was the original describer of a number of still-valid species and subspecies of American reptiles, including the following: *Crotaphytus collaris collaris, Cnemidophorus tessellatus, Lygosoma laterale, Natrix rigida, Natrix septemvittata, Thamnophis sauritus proximus, Thamnophis sirtalis parietalis, Carphophis amoenus amoenus, Coluber constrictor flaviventris, Masticophis flagellum testaceus, Elaphe obsoleta obsoleta,* and *Sistrurus catenatus tergeminus.* He also was the original describer of a western amphibian, *Bufo cognatus.* The toad and all but three of the twelve reptiles (the two water snakes and the eastern worm snake) were collected on Long's Expedition (Schmidt, 1953). These accomplishments alone would have made the reputation of any herpetologist.

There is every reason to suppose that Thomas Say closely examined the collected specimen of "chirotes" on that long-ago day in late June of 1820 in the remote, cactus-studded reaches of the South Platte Valley and then and there wrote out his usual careful description of the strange and unexpected creature. That the specimen was later lost is a great pity but not difficult to understand when we recall that the explorers were engaged in a long, hard, and dangerous journey, much of it through hostile and virtually unknown territory where mere survival was sometimes doubtful. The further loss, when the expedition had almost regained the safety of the frontier settlements, of nearly all the precious zoological notes so laboriously accumulated ever since the expedition headed westward from Council Bluffs on the Missouri River is an even greater pity. They were in saddlebags which were stolen by three deserters from the expedition's small military escort, and were



never recovered despite strenous efforts to do so.

Did a species of *Bipes*, or at any rate a *Bipes*-like reptile, occur in the South Platte Valley of southwestern Nebraska or northeastern Colorado in 1820? I do not see how we can seriously doubt it unless we simply disregard the explicit testimony of Long's Expedition. Whether the creature still occurs there is an altogether different matter in view of the great ecological changes which have taken place in the region since the advent of white settlement. On geographical grounds it might seem even less likely that *Bipes* ever existed in Nebraska or Colorado than in Arizona, which of course is much nearer the known range of the genus in southern Baja California and the southern Mexican mainland. But the Amphisbaenia is an ancient relict group of reptiles, a fact clearly evident from the scattered distribution over the globe of the known species, so it is not impossible that recent species of *Bipes* could have occupied, or might even still occupy, widely separated localities in the American West. It is at least arguable that the "chirotes" of Long's Expedition were members of a relict local population of an amphisbaenian species even then on the verge of extinction and now probably extinct.

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Regional Society News

REGIONAL HERPETOLOGICAL PUBLICATIONS FIND PERMANENT HOME

It is now common knowledge that interesting and valuable herpetological information is being printed in numerous regional newsletters. The herpetological community now has a centralized location where regional works will be housed and where copies of particular articles can be secured. Ms. Nina J. Root, librarian at the American Museum of Natural History, has offered to be the recipient of all past, present and future newsletters, bulletins, and other publications of our various regional herpetological societies. The library at AMNH will catalogue all materials into their permanent collection, and will provide photo copies of articles at a nominal fee upon request. It is vitally important that all regional herpetological societies furnish the museum with complete volumes of past newsletters, and that the museum library be permanently placed on their mailing lists.

Send your regional newsletters, etc. to:
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REGIONAL HERPETOLOGICAL SOCIETIES: A PERSPECTIVE

Regional herpetological societies are a relatively new phenomenon, although Chicago had a herpetologists' club in 1941. At least 40 regional societies occur in the United States, and others are to be found scattered throughout the world. Interest in herpetology has grown, but not as rapidly nor to the same extent that it has in ornithology. For the past decade, I have been actively associated with the Chicago Herpetological Society and have become acquainted with some other societies through correspondance and annual regional meetings. Some observations and thoughts on the function of regional societies and their relationship to professional herpetologists seem appropriate at this time. Some of the following is based on the history of the Chicago Herpetological Society and the specifics may be atypical of other societies.

Regional societies are made up of a diverse cross-section of the population: age varies from 12 years old to senior citizens; education ranges from people who did not finish the first eight grades to people with advanced degrees in a variety of disciplines; economic status is just as variable. The one common bond is an interest in amphibians and reptiles.

The present Chicago Herpetological Society was formed in 1966 when a reptile fancier placed a classified ad in a local newspaper. A small nucleus of interested people gathered, and within a short time the membership was nearing 100 people. By the late 1960's, the CHS meetings were a center for amphibian and reptile commerce. On the last Wednesday of each month, animals, such as Galapagos tortoises, South American coral snakes and crocodilians, could be viewed, bought, sold or traded. In the early 1970's, the animal trade was banned at CHS meetings. Predictions of the collapse of the organization proved unfounded. Members still buy, sell and trade animals, but not at the meetings and not on the scale of the late '60's. Few dangerous or endangered animals appear at meetings, or in members' collections, possibly from fear of peer pressure, but hopefully because fewer are available for private collections. Fifty to 100 members attend each monthly meeting to interact with others holding similar interests and to view the programs, which regularly feature professional herpetologists.

As regional societies evolve, they must go through a maturation process analogous to the one experienced by the CHS. Maturation may occur at different rates, but it is inevitable. Clearly, the maturing of a regional society is a time of turmoil, and the survival of the society is dependent upon the people available to fill leadership roles.

Kauffeld (1973) proposed a national organization of amateur herpetologists, suggesting that it be called the Holbrook Society and that it be modeled after the Audubon Society. The parallels between the amateur and professional in herpetology and ornithology are striking and interesting.

Although birders are supposedly a conservation-minded cult, Graham (1979) discusses problems caused by some birders' misguided enthusiasm. Graham's article "Case of the Ugly Birder" describes the mad rush of birders to Arizona's Chiricahua Mountains to observe, photograph and record the elegant trogon, *Trogon elegans*. Reptile collectors invade the same location each year to turn rocks and logs, probably the same ones that have been trampled by the birders, in search of an Arizona mountain kingsnake, *Lampropeltis pyromelana*. Certainly, these behaviors have homologous motivation, and both have negative affects on the organisms which are viewed with affection by the hunters. An article titled "Case of the Ugly Herper" would not be difficult to compose. Clearly, regional societies are the place to spread an environmental—conservation oriented ethic.

Graham noted that the American Birding Association (ABA) ". . . was formed in 1969 to promote the hobby of birding and the study of birds. . ." and to emphasize the pleasures of

the chase. Regional societies would do well to follow this approach. McCraine and Wilson (1979) have suggested that descriptions of new taxa not be published in regional society publications, a suggestion with which I completely agree. Regional publications should be used to inform members of current thinking, discoveries, and conservation efforts, but not as a replacement for already existing professional journals. The majority of regional society members are not interested in reading quantitative research or systematic revisions. They are, I believe, more interested in good quality natural history and husbandry articles. Regional and professional journals should fill two distinct niches, although at the present time there is some overlap.

Roger Tory Peterson has been quoted as saying that the ABA is "a healthy antidote to the academic snobbery of some professionals" (Graham, 1979). The extent to which this exists in herpetology is undetermined. While some professional herpetologists take an enthusiastic and active role in regional societies, others shun them. However, the relationship between the amateur and professional herpetologists can be viewed as protocooperation as defined by Odum (1959). Interaction is favorable to amateur and professional but the relationship has not yet evolved to the point of obligatory mutualism. Some professionals have done much to stimulate interest among amateurs. Indeed, how many Ph.D. herpetologists started in the amateur ranks? On the other side of the coin, it would be interesting to have statistics on the number of academic careers in herpetology influenced by amateurs. The role of the amateur has been important throughout the history of biological sciences. Where would modern biology be without the efforts of two talented amateurs named Darwin and Wallace? Therefore, who better to provide guidance and encouragement for regional societies than the local professionals.

Regional societies can be used for the betterment of herpetology. Mitchell (1979) has suggested using regional societies to gather phenological data, much in the same way population counts and migratory data are collected by the Audubon Society chapters. Collecting phenological data by regional societies would require organization, but it would provide a massive data base for life history studies. It would also provide an excellent direction for the field oriented amateur, and could be used to reinforce a conservation ethic. Applegarth (1975) has suggested a herpetological life list similar to the one used by birders. In order for a specimen to qualify for the list, it cannot be removed from the wild. The SSAR's Standard Common and Scientific Names for North American Amphibians and Reptiles could be promoted as the reference list for such activities.

The future of amateur herpetology is bright; new regional societies are organizing. Although a few disband, others become increasingly stable. The Chicago Herpetological Society had over 500 members at the end of 1979. Birding tours have become a big business in recent years. How long will it be before travel agencies offer tours for the herpetologist? The CHS has had organized field trips for several years. 1980 will see a CHS organized field trip to Australia, specifically aimed at observing and photographing herptiles.

A loose network of communication between regional societies and the SSAR Liaison Committee has been established. Unfortunately, obtaining responses from some regional societies has been difficult. The Committee can use your assistance. If you are in contact with members of a regional society listed in HR 10(4):110-111, an inquiry into who handles the correspondance with the Liaison Committee could prove productive. Should you know of a regional society that is not on the list, I ask that you contact the Committee Chairman. The Liaison Committee realizes that all regional societies may not be interested in annual meetings or grant programs. However, as societies mature and grow, interests change.

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JOHN C. MURPHY
HR Regional Societies Section Editor ●

Legislative Alert

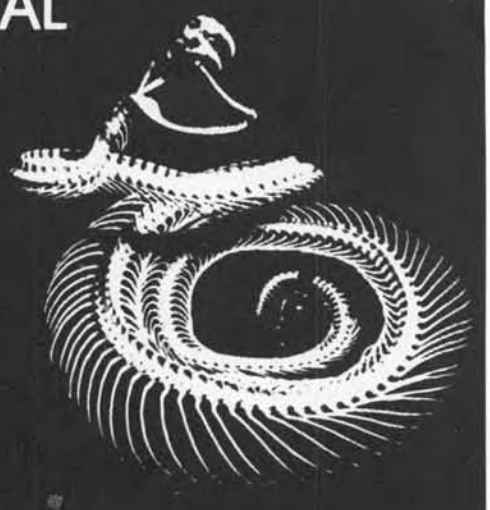
28 November 1979

Dr. Jere Edwin Goyen
Commissioner
Food and Drug Administration
5600 Fishers Lane
Rockville, Maryland 20852

Dear Dr. Goyen:

The Society for the Study of Amphibians and Reptiles (SSAR) is an international organization with over 1,800 members. It is deeply concerned with the petition prepared by the National Turtle Farmers and Shippers Association (NTFSA) to lift the ban on domestic

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turtle sales (petition enclosed). Problems involved in the petition are as follows:

1. Turtles may not be able to survive in the bubble without food for the length of time it takes the animal to reach the consumer from the turtle farm. The petition states that after hatching, baby turtles can live on their yolk for one year, but there were no data to substantiate this. Serious doubt exists that the animals could live this long without food.
2. Liquid wastes may accumulate in the bubbles, killing the turtles before they reach the consumer.
3. Standards of shipping temperatures should be established. The bubbles should be kept from direct sunlight, as the greenhouse effect would cause temperatures to raise drastically.
4. Resistant strains of *Salmonella* and *Arizona* may develop from the treatment of eggs described in the enclosure. Regular checks by the Food and Drug Administration for *Salmonella* and *Arizona* of turtles being sold should be made. Concern also exists relevant to possible long term deleterious effects on turtles from the gentamicin egg treatment.
5. Turtle eggs should not be collected from the wild, as this may damage wild populations. Turtles sold as pets should be those that were a result of captive breeding.
6. The chance that a child will contract *Salmonella* or *Arizona* from a baby turtle will always exist, even if the turtle is free of these organisms when purchased. The turtle may acquire and foster the disease once in the home.
7. If all bacteria are killed in the turtle's bubble environment, questions arise as to the animal's ability to properly digest food.

In considering the above seven points, the SSAR feels that the enclosed proposal to lift the ban on domestic turtle sales is not feasible. From the information available, it appears that implementing the NTFSA plan would result in the inhumane treatment and death of thousands of baby turtles.

Sincerely,

Hugh Quinn
Chairperson
SSAR Legislative Alert Committee ●

Herpetological Husbandry

This section of **Herpetological Review** deals specifically with the husbandry of captive reptiles and amphibians. Articles concerning any aspect of successful exhibit design, techniques for maintenance and breeding, egg incubation, and rearing of the young are acceptable based on the success of the husbandry program, the quality of written work, and the overall value of the presented material to the herpetological community. Reproductive articles should stress the actual methods and specimen manipulation involved but may also include observations of behavior, growth, and statistical data. Of particular interest are reports describing consistently successful, long term programs which deal with large numbers of a single species or genus.

Longer husbandry manuscripts should be divided into appropriate sections including Literature Cited. Black and white photos and line drawings are acceptable. All manuscripts will be reviewed by the Section Editor, and frequently by another individual within the particular area of expertise. Reports which do not deal with herpetological husbandry *per se* (for example, the description of eggs and young from a wild-caught gravid female) will be forwarded to the Editor for consideration as a Feature Article. In order to reduce publication time, husbandry articles should be sent directly to the Section Editor, Bern W. Tryon, Dept. of Herpetology, Fort Worth Zoological Park, 2727 Zoological Park Drive, Fort Worth, TX 76110.

EQUATING FOOD AMOUNT FOR LABORATORY REARED TURTLES

We have been observing young snapping turtles (*Chelydra s. serpentina*) in our laboratory for several years. One phenomenon of interest is the differential growth rates among the turtles. Since growth depends on temperature and amount of food, we sought to at least record, if not control, variation in these factors. At first, the amount of food (beef liver) given to each turtle was quite variable because we simply tried to cut small similar-sized chunks. Mr. Denis Hancock, a colleague, suggested a simple technique which has given us much more precision in food amount. We now use a modified syringe to equalize the amounts of food given to each turtle.

The 12cc plastic syringe is prepared by cutting off the end which accommodates the needle. This provides a continuous cylinder with holes on both ends. Liver is cut into strips about the diameter of the cylinder and is sprinkled with vitamin and mineral supplements before being inserted into the syringe. A plunger at both ends is used to force out excess air and this preparation is then frozen.

For feeding, the frozen liver is pushed from the syringe and cut with a single-edge razor blade at .2cc intervals. These thin circles rapidly thaw and provide fairly equivalent amounts of food for each of the turtles which are housed separately. The mean weight of a sample of 25 slices which were air dried for three hours before weighing was .108g (s.d. = .014g).

This simple and inexpensive technique for equating food amounts could be easily adapted to different situations. Larger syringes could be used for larger pieces of food and other foods could be substituted for the liver.

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COPROPHAGY IN *THAMNOPHIS S. SIRTALIS*

Certain reptiles have been known to ingest their own fecal material, notably tortoises of the family *Testudinidae* (Grzimek, 1975) and *Dipsosaurus* (Stebbins, 1966). However, I have found no reports of this behavior in snakes.

A female *Thamnophis s. sirtalis* collected in 1974 at Sargent, Matagorda County, Texas has been in the reserve section of the Houston Zoo for four years. The snake is 66.6 cm SV, 72.4 total length and weighs 185.5 gm. It was caged in an all-glass 16 liter aquarium measuring 36 x 21.5 x 26 cm. Light was provided by a Westinghouse fluorescent 40 watt tube 2 m. above the cage. Water was available at all times, and the ophidian was fed a half or full grown mouse each week.

In the early part of October 1978, the snake was observed ingesting its feces immediately after defecation. The fecal matter appeared to consist primarily of mouse hairs. The snake has not since been observed repeating this behavior.

ACKNOWLEDGEMENTS

I am grateful to Hugh R. Quinn and John E. Werler for reviewing this manuscript and to the Herpetological Staff of the Houston Zoo for their assistance.

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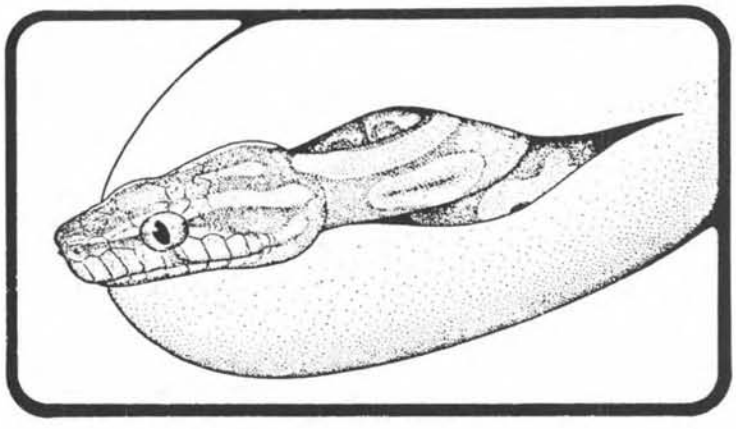
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CARPENTER *An Ethological Approach to Reproductive Success in Reptiles*
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HONEGGER *Breeding Endangered Species of Reptiles*
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WAGNER *Gecko Husbandry and Reproduction*
MENDELSSOHN *Observations on a Captive Colony of* Iguana
HUFF *Captive Propagation of the Subfamily Boinae with Emphasis on the Genus* Epicrates
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●*Index*

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

THE REPRODUCTIVE BIOLOGY OF *BOMBINA ORIENTALIS*, WITH NOTES ON CARE

The leopard frog, *Rana pipiens*, has been an important resource for developmental studies for a number of years. Recently, however, use of this organism has become restricted; the supply of breeding animals has declined, and the quality of eggs has deteriorated (Gibbs, Nace, and Emmons, 1971; Anonymous, 1973). This situation has led us to search for alternative laboratory amphibians for use in developmental studies. Workers in several laboratories have suggested that *Bombina orientalis*, the oriental fire-bellied toad, may be a superior research animal (Nace and Ryuzaki, personal communication; Kawamura, Nishioka, and Ueda, 1972). If this animal is to be used for developmental studies it is imperative that its reproductive biology be well understood. As a preliminary to nuclear transplantation studies, we have developed reliable methods for controlling ovulation.

Sexually mature male and female toads were obtained from the Amphibian Facility, University of Michigan. The animals were kept in covered plastic boxes (about 25 cm by 34 cm by 8 cm deep) containing dechlorinated tap water; up to 9 animals were kept in each box. The boxes were tilted, providing a dry surface at one end and a shallow pool of water at the other end. Wastes accumulate in the water, as does a toxin produced by the toads, so it is important that the water be changed regularly; we changed the water daily or every other day. The animals readily eat living crickets, earthworms, and mealworms. Additionally, we found that it was easy to train the animals to accept pieces of beef liver from forceps; liver made up the bulk of the diet of our toads, which were fed three times a week.

Standard amphibian methods may be used to induce ovulation (Rugh, 1962). We successfully used injection of anuran pituitary glands into the abdominal cavity and injection of human chorionic gonadotropin (HCG) into either the abdominal cavity or the dorsal lymph sac. Dorsal subcutaneous injection of HCG (Ayerst or Sigma) proved to be the most reliable procedure. From April through October a dose of 125 international units (iu) was sufficient to induce ovulation; doses of about 250 iu were required during the remainder of the year. Males were induced to couple with injected females by similar hormone injections. Dosages for males were approximately one-half those required for females. Injected pairs were mated in large glass bowls containing about one cm dechlorinated tap water; the bowls were kept in the dark during mating, with mating typically done at room temperature. Onset of egg release varied, beginning as soon as 10 hours after injection or as late as 18 hours after injection; on rare occasions, eggs were not released until more than 20 hours after injection. Generally, the interval between injection and onset of egg release was temperature dependent; at 25°C the time was usually about 10 hours, while at 18°C the time was usually about 18 hours. Egg release continued for up to 10 hours after onset.

Fertilized eggs were transferred to finger bowls, where they were reared in 10% Barth's solution X (Barth and Barth, 1959) or in dechlorinated tap water. While tadpoles can be reared to metamorphosis in finger bowls, we found that optimal growth resulted when tadpoles were reared in aquaria containing aerated tap water and aquatic plants. Tadpoles were fed boiled romaine lettuce; additionally they grazed on the algal growth lining the aquaria walls. It was not necessary to change the water in aquaria during the larval period; water was changed daily for tadpoles reared in finger bowls.

At the onset of metamorphosis, the animals were removed from the aquaria and were placed in plastic boxes similar to those used for the adults. For the first several weeks after metamorphosis, the juveniles were fed adult *Drosophila melanogaster*; the toads were then taught to accept liver from forceps, and their diet was gradually shifted to that characteristic of the adults. Animals were reared to sexual maturity in approximately one year.

For many experiments it is desirable to have fertilized eggs available at a designated time. The method of mating discussed above does not insure this, since there is a great deal of variability in the interval between hormone injection and the onset of egg release. Eggs can be artificially inseminated using standard procedures for amphibians (Rugh, 1962), but this requires sacrifice of the male. Because of a population of limited size we developed a procedure that allows close control over the onset of egg release. In the absence of the stimulus of a clasping male a hormone-injected female kept at 18°C will begin to shed eggs spontaneously about 18 hours after injection. We found that if the male and female were injected and kept apart for about 16 hours at 18°C, then the female was "primed" for egg release. Placing the male and female together at that time led to immediate amplexus. Egg release consistently began within one hour of mating. This close control made it possible to perform experiments with freshly fertilized eggs at designated times.

We also tried other means of controlling egg release in *Bombina*. Spontaneous egg release can be prevented in ovulated *R. pipiens* by maintaining the females at 4°C (Rugh, 1962); a female will retain viable eggs for several days under these conditions. In several instances, *B. orientalis* females were placed at 4°C at the onset of spontaneous egg release. This led to immediate cessation of egg shedding. Eggs were again released after the females were returned to room temperature. However, even after as short a period as 2 hours at 4°C, most of the subsequently released eggs were inviable. Therefore it is apparent that cold temperature may not be used to control egg release in *B. orientalis*.

In our nuclear transplantation studies, it was necessary to obtain unfertilized eggs at specific times. The eggs of *B. orientalis* are considerably larger than those of *R. pipiens* (2.0 to 2.5 mm in diameter as opposed to 1.0 to 1.5 mm in diameter), though *B. orientalis* is much smaller than *R. pipiens*. Further, the *Bombina* eggs are more fragile than the *Rana* eggs. Consequently, eggs cannot be stripped from *B. orientalis* females using the procedures developed for *R. pipiens* (Rugh, 1962). Stripping of *B. orientalis* eggs in this fashion leads to deformation and damage, as is indicated by disruption of the egg pigment pattern. However, it is possible to obtain undamaged eggs from hormone-injected females. A female toad, injected 16 hours earlier and kept at 18°C, was placed in a dish with shallow water. The toad was then grasped immediately anterior to the pelvic girdle with the thumb and forefinger. A steady but gentle pressure was applied for several minutes; the female responded to this pressure and began to lay eggs. The eggs were propelled along the oviduct by the toad's own muscular contractions rather than by external pressure, and the eggs were shed undamaged. The procedure apparently mimics natural amplexus. The viability of eggs obtained in this manner was indicated by their ability to be fertilized by a sperm suspension.

Our studies indicate that *B. orientalis* is indeed an ideal laboratory amphibian. The animal is hardy and easy to care for. Eggs may be obtained throughout the year. Animals can be bred repeatedly. An average female will produce 100 to 200 eggs per ovulation if the interval between ovulations is 6 weeks; if the interval is 3 months, the number of eggs expected is 200 to 400. The percentage of fertilization remains consistently high (about 95%) if the females are kept on a regular breeding schedule. We usually mated the females once every 6 weeks to 2 months and the males once every month; the males have been used as often as once a week with good results. The eggs are large and can be experimentally manipulated (Ellinger and Carlson, 1978). We feel *Bombina* has the potential to be an outstanding laboratory resource, one which possesses desirable traits not found in some commonly used anurans. In many ways, its characteristics resemble those of *Ambystoma mexicanum*, which is becoming a very popular organism for developmental and genetic studies (Malacinski and Brothers, 1974). The procedures discussed above provide a reliable approach for exploiting the reproductive biology of *Bombina* in the laboratory.

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JOHN T. CARLSON and **MARK S. ELLINGER**
Department of Zoology
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and

Department of Zoology
Southern Illinois University
Carbondale, Illinois 62901 (MSE)

specimen are labeled with the correct Latin name.

No one decries the incorrect identifications in "picture books" more than myself. There are surprisingly few obvious misidentifications in this book (at least among the species with which I am familiar)—and I was quite dismayed to note that one of them was due in part to me. Anyone wishing to obtain a slide of *Ambystoma laterale* (collected near Chicago, Ill.) can write to me and I will put one in the mail promptly.

John R. MacGregor
102 Fourth Street
Nicholasville, Ky 40356

NEWSNOTES

BOTANY—NATURAL HISTORY OF PANAMA

A symposium to signal completion of the Flora of Panama will be held 14-17 April. Sessions will cover the physical setting, archaeology, vegetation, flora, fauna and demography of Panama and nearby countries, as well as other natural history related topics. A number of herpetology papers will be presented. Both invited and contributed papers will be given, and simultaneous Spanish/English translation will be provided. For further information, contact:

Prof. Mireya D. Correa A.
Escuela de Sciencias Naturales y Foramacia
Estaseta Universitaria
Univ. of Panama
Republic of Panama

Information on financial assistance is available from:

W. G. D'Arcy
Missouri Botanical Garden
2315 Tower Grove Ave.
St. Louis, MO 63110

AUDUBON GUIDE ERRATUM

I wish to express my sincere apologies to the herpetological community for the misrepresentation which appeared in the recently-published *Audubon Society Field Guide to North American Reptiles and Amphibians*. As many have undoubtedly noticed, Plate 58 is an illustration of *Ambystoma jeffersonianum* rather than *A. laterale*. The specimen was collected in Jessamine County, Kentucky in October of 1977 and was photographed as a representative adult in non-breeding condition. I am not sure at this time how the slide was labeled (it has not been returned from the publisher), but others in my files of the same

AWARDS FOR STUDY AT ANSP

The Academy of Natural Sciences of Philadelphia, through its Jessup and McHenry funds, makes available each year a limited number of awards to support students pursuing natural history studies at the Academy. Awards usually include a stipend to defray living expenses, and support for travel to and from the Academy. Current application deadlines are 1 April and 1 October 1980. Further information may be obtained by writing to: Chairman, Jessup-McHenry Award Committee, Academy of Natural Sciences of Philadelphia, 19th and the Parkway, Philadelphia, Pennsylvania 19103.

COLUBRID SNAKEBITE EFFECTS—INFORMATION REQUESTED

I am compiling worldwide records on colubrid snakebite effects in prey, experimental animals, and humans for a second review article. Any information, particularly unpublished observations and citations for papers in journals not widely circulated, would be appreciated. Please contact Donald M. McKinstry, Department of Biology, Behrend College, The Pennsylvania State University, Erie, Pennsylvania 16563.

BUFO MARINUS PUBLICATIONS

Bufo marinus is one of the most widely distributed of amphibians. The species is naturally found from southern Texas to central Brazil. The toad has become a popular subject for introduction to new locations, starting in the early 1800's into the Carribean islands. In the 1900's, the species was carried into the Pacific via Hawaii. At present the toad is rapidly expanding its range in continental Australia (at about 8% per annum). Australian interest in the species is large since it is considered to be a minor pest. In order to predict the eventual range of the species on the continent, we have begun compiling the range records for both natural and introduced populations. The records include both museum specimens and survey sightings (especially in Australia). We are publishing these records to provide a baseline account of the distribution to serve as a basis for future work on the species (particularly an analysis of its tolerance to climatic variables). The publications will be in 4 parts under the general title "The distributional records of the marine toad, *Bufo marinus*": Part 1, Australia; Part 2, the Pacific islands; Part 3, The Carribean and Florida, USA; and Part. 4, Mainland Latin America. The first part will be available in early 1980 and can be obtained, gratis, from:

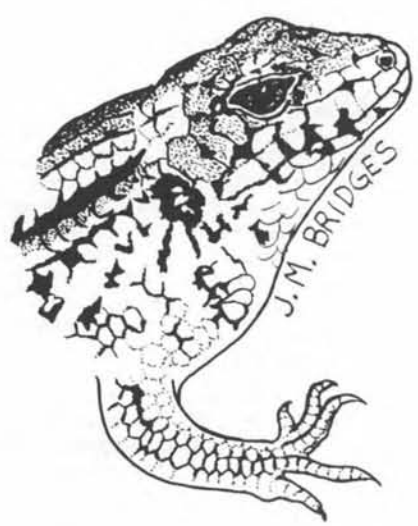
School Administrator
School of Australian Environmental Studies
Griffith University
Nathan, (Brisbane), 4111, Australia.

ERRATA: HR 10(4):119-121

Ideker (**HR** 10(2):60) earlier reported *Nerodia rhombifera* from Starr Co.
Hypopachus variolosus TAIC-2987 should read TAIC-2897
Scaphiopus holbrooki TAIC-2983(4) should read TAIC-2893(4)
Chrysemys concinna—Llano Co. specimen is TAIC-4559, ommitted in ms.
Arizona elegans Comanche Co.—collected on 28 May 1978 by J. P. Karges
Coluber constrictor Kerr Co. locality should read 20.8 km S Kerrville

AMPHIBIAN PHYSIOLOGY SYMPOSIUM

June 24-25, 1980 at University of California (Davis). Sessions include Water Relations, Thermoregulation, and Aerobic/Anaerobic metabolism. For more info, contact: Robert C. Drewes, Dept. of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118.



GEOGRAPHIC DISTRIBUTION

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The *standard format* for a geographic distribution record is:

Scientific name (common name) as it appears in *Standard Common and Current Scientific Names for North American Amphibians and Reptiles* (Collins, Huheey, Knight and Smith, 1978). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalog number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the **standard format** only to Joseph T. Collins, Museum of Natural History, Univ. of Kansas, Lawrence, KS 66045. Short manuscripts are only acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new distribution records appearing in *Herpetological Review* is: Jones, J. 1977. Geographic distribution: *Rana pipiens*. SSAR Herp. Review 8(1): 1.

GYMNOPHIONA

SCOLECOMORPHUS VITTATUS (African Caecilian). Kilimanjaro Region, Pare District, North Pare Mountains, Kifula, Ugweno. 13 December 1976. C. A. Msuya. Verified by B. Clarke, British Museum (Natural History), in collection of K. M. Howell (KMH 311). Duplicates collected earlier at same locality in December, 1975 deposited in University of Dar es Salaam Vertebrate Collection (UDSM 683-684). Species known previously from Usambara and Magrotto (120 km southeast present locality) and Uluguru Mountains (360 km south of present locality) (Loveridge, 1957, Bull. Mus. Comp. Zool. 117(2):306).

Submitted by **K. M. HOWELL** and **C. A. MSUYA**, Box 35064, Department of Zoology, University of Dar es Salaam, Dar es Salaam, Tanzania. ●

CAUDATA

AMBYSTOMA JEFFERSONIANUM (Jefferson Salamander). USA: KENTUCKY: Larue Co: 16 km SE Hodgenville (junction of Pleasant Ridge Church Road and Ball Hollow Road). 16 November 1979. Steven Sondergard. Identified by R. E. Todd, Jr. Verified by Burt Monroe, Univ. Louisville. Collection of R. E. Todd, Jr. (RET 477). First record for Larue County.

Submitted by **ROBERT E. TODD, JR.**, Route 1, Box 90-B, Sonora, Kentucky 42776. ●

AMBYSTOMA TALPOIDEUM (Mole Salamander). USA: ARKANSAS: Cross Co: Village Creek State Park. 12 May 1979. K. B. Sutton. Arkansas State University Zool. Coll. (ASUZ 3745). Cross Co: Village Creek State Park. 8 June 1979. K. N. Paige. Both specimens identified by K. N. Paige. Village Creek Zool. Coll. (VCZC A13). Due to the burrowing habit of this species and lack of collecting there are few records from northeastern Arkansas, this being the first in 32 years. The only known records in northeast Arkansas are from Clay County (Parker, 1947. Proc. Arkansas Acad. Sci. 2: 15-30.).

Submitted by **K. B. SUTTON** and **KENNETH N. PAIGE**, Department of Biology, Arkansas State University, Arkansas 72467. ●

EURYCEA QUADRIDIGITATA (Dwarf Salamander). USA: ARKANSAS: Ashley Co: 8.9 km N Hamburg on US Rt. 81. 26 March 1976. C. R. Tumlison. Verified by E. J. Bacon. University of Arkansas at Monticello Collection of Vertebrates (UAM 1413). First known specimen from Ashley County. Extends range *ca.* 29 km S (E. J. Bacon, 1976, Proc. Arkansas Acad. Sci. 30:14-15).

Submitted by **C. R. TUMLISON,** Department of Biology, University of Arkansas, Monticello, Arkansas 71655. ●

HEMIDACYTLIUM SCUTATUM (Four-toed salamander). USA: ILLINOIS: McConough Co: 17.7 km S Macomb (Sec. 27, T4N, R3W). 4 October 1979. L. Frankland and R. Vogel, IL Dept. of Conservation. Verified by R. Brandon, Southern Illinois Univ., Dept. Zoology. Will be donated to Illinois Natural History Survey Museum. Two males collected from a small sandstone outcropping along a dry creek band in a wooded area. Habitat was totally different as depicted by Smith, P. 1961. The amphibians and reptiles of Illinois. Nat. Hist. Survey Bull. 28 (1): 1-298. First record for McDonough Co. and extreme west central Illinois. Continues the sporadic occurrence of *H. Scutatum* in Illinois.

Submitted by **LES FRANKLAND,** Illinois Department of Conservation, Box D, Benton, Illinois 62812. ●

NOTOPHTHALMUS PERSTRIATUS (Striped Newt). USA: FLORIDA: Wakulla Co: St. Marks National Wildlife Refuge, 1 km SW Panacea Park, center sec. 26, T5S, R2W, and 0.5 km NW Panacea Park, SW ¼ sec. 23, T5S, R2W. 7 Dec 1977 - 9 Mar 1978; collected by National Fish and Wildlife Laboratory. Verified by Howard I. Kochman. Florida State Museum, UF 45398-45409. Extends known range west of Apalachee Bay (Mecham, 1967. Cat. American Amphibs. Repts., pp. 38.1-38.2) and approximately 40 km SW of Tallahassee (Christman and Means, 1979, *in* R. W. McDiarmid, ed., Rare and Endangered Biota of Florida, Vol. 3, Amphibians and Reptiles. Univ. Press of Florida, Gainesville). The species is locally abundant in the sandhills of southwestern Wakulla Co.

Submitted by **C. R. SMITH, STEVEN P. CHRISTMAN, HOWARD W. CAMPBELL** and **HOWARD I. KOCHMAN,** National Fish and Wildlife Laboratory, U.S. Fish and Wildlife Service, 412 NE 16th Ave., Gainesville, Florida 32601. ●

SIREN INTERMEDIA NETTINGI (Western Lesser Siren). USA: ARKANSAS: Pope Co: Arkansas Tech University campus in Russellville. 11 March 1974. G. Turnipseed. Arkansas Tech Univ. uncat (field number GDT 40). Northwestward range extension of *ca.* 125 km (Martof, 1973, Cat. Amer. Amphib. Rept. 127.1-127.3).

Submitted by **GLYN TURNIPSEED,** Department of Biology, Arkansas Tech University, Russellville, Arkansas 72801. ●

STEREOCHILUS MARGINATUS (Many-lined Salamander). USA: GEORGIA: Atkinson Co: 4.2 km S Pearson on U. S. Rt. 221 (1 km S jct. U.S. Rts. 221 and 441). 26 October 1978. F. G. Thompson, H. W. Campbell and S. P. Christman. Verified by S. P. Christman. Florida State Museum, Gainesville (VF 45279). Northwestern extension of range of 73 km and first record for Atkinson County (Christman and Kochman, 1975, Florida Sci. 38(3): 139-141).

Submitted by **HOWARD W. CAMPBELL, STEVEN P. CHRISTMAN,** and **FREDRICK G. THOMPSON,** National Fish and Wildlife Laboratory, 412 N.E. 16th Avenue, and Florida State Museum, University of Florida, both in Gainesville, Florida 32601. ●

ANURA

GASTROPHRYNE CAROLINENSIS (Eastern Narrowmouth Toad). USA: ARKANSAS: Pope Co: 6.4 km SE Dardanelle on Holla Bend National Wildlife Refuge. 2 June 1976. B. Shackleford. Arkansas Tech. Univ. uncat (field number GDT 88); Yell Co: 4.02 km S Dardanelle on Rt. 155. 16 May 1976. D. Carroll. Arkansas Tech. Univ. uncat (field number GDT 68). New county records for west-central Arkansas (Nelson, 1972, Cat. Amer. Amph. Rept. 120.1-120.4).

Submitted by **GLYN TURNIPSEED,** Department of Biology, Arkansas Tech University, Russellville, Arkansas 72801. ●

GASTROPHRYNE OLIVACEA (Great Plains Narrowmouth Toad). USA: COLORADO: Baca Co: 37 km S and 8 km W Pritchett. 29 May 1979. G. Hammerson and L. Livo. Univ. Colorado Mus., Boulder (UC 51967-51968); 36.2 km S and 19.3 km W Pritchett. 18 July 1979. G. Hammerson (UC 51966); 37.8 km S and 1.6 km E Pritchett. 18 July 1979. G. Hammerson (UC 51965). 29.8 km S and 16.1 km W Pritchett. 1 August 1979. G. Hammerson (UC 51964). Verified by H. M. Smith. First records for the state. Extension of 30 km NW of Collins' record (1979, Herp. Rev. 10(3):101) of major westward range extension in northern portion of range. Specimens of 29 May were found under rocks on a hillside near a stock

pond; all others were collected from choruses in rain pools or stock ponds.

Submitted by **GEOFFREY A. HAMMERSON,** Department of Environmental, Population and Organismic Biology, University of Colorado, Boulder, Colorado 80309. ●

HYLA AVIVOCA (Bird-voiced Treefrog). USA: ARKANSAS: Conway Co: 8.5 km NE Atkins near Goose Pond. 18 June 1976. G. Turnipseed. Arkansas Tech Univ. uncat (field number GDT 116). Second record for west-central Arkansas (Turnipseed, 1976, Herp. Review 7(4):178-179).

Submitted by **GLYN TURNIPSEED,** Department of Biology, Arkansas Tech University, Russellville, Arkansas 72801. ●

RANA SYLVATICA (Wood Frog). USA: ARKANSAS: Johnson Co: 14.5 km W Pelsor, north of Rt. 123. 10 April 1976. H. Raney and M. Johnson. Arkansas Tech Univ. uncat (field number GDT 181). Additional record for disjunct population in northwestern Arkansas (Martof, 1970, Cat. Amer. Amph. Rept. 86.1-86.4).

Submitted by **GLYN TURNIPSEED,** Department of Biology, Arkansas Tech University, Russellville, Arkansas 72801. ●

SCAPHIOPUS HOLBROOKI HURTERI (Hurter's Spadefoot). USA: ARKANSAS: Yell Co: 4.83 km S Dardanelle on Rt. 7. 12 April 1977. L. Sheely and R. Shott. Arkansas Tech Univ. uncat (field number GDT 191); Pope Co: 6.44 km SE Dardanelle on Holla Bend National Wildlife Refuge. 7 June 1978. L. Shott. Arkansas Tech Univ. uncat (field number GDT 193). Eastward extension of range in Arkansas of *ca.* 100 km (Wasserman, 1968, Cat. Amer. Amph. Rept. 70.1-70.4).

Submitted by **GLYN TURNIPSEED,** Department of Biology, Arkansas Tech University, Russellville, Arkansas 72801. ●

TESTUDINES

CLEMMYS MUHLENBERGI (Bog Turtle). USA: GEORGIA: Union Co: Chattahoochee National Forest. 10.5 km SSE Blairsville. 8 May 1979. P. E. Hale and M. J. Harris. Verified by E. E. Provost, Zoology Department, University of Georgia. Univ. Ga. Nat. Hist. Mus. (UGA 1541-series of four color photographs). Total of 5 captures made in same vicinity from 8 May 1979 to 16 July 1979; at least three different individuals, all released. First record for the state and extends the range at least 22.5 km S from the southern boundary of Clay County, North Carolina; this bordering county has at least two records, neither of which gives exact location data (Brimley, 1922, Copeia, No. 107:48; Nemuras, 1974, Wildl. North Carolina, 38(2):13-15).

Submitted by **PHILIP E. HALE** and **MICHAEL J. HARRIS,** Institute of Natural Resources and School of Forest Resources, University of Georgia, Athens, Georgia 30602. ●

EMYDOIDEA BLANDINGI (Blanding's Turtle). CANADA: ONTARIO: Frontenac Co: Marsh on NW shore of Grenadier Island. 12 October 1978. B. Collins. Collection of P. J. Petokas, PJP 141 (shell only). Verified by M. M. Alexander. Previous records of the Blanding's turtle from islands in the International section of the St. Lawrence River include only those for Wellesley Island, USA (Werner, 1959, Copeia 1959(2): 170-172; Petokas and Alexander, 1978, SSAR Herp. Rev. 9(3):107) and Niagara Island, Canada (Toner, 1936, Copeia 1936(4): 236-237). This species has been observed to nest on Grenadier Island and is reported to be common in the marshes of the NW shore (B. Collins, pers. comm.).

Submitted by **PETER J. PETOKAS,** U. S. Fish and Wildlife Service, 100 Grange Place, Cortland, New York 13045 and **MAURICE M. ALEXANDER,** Department of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry, Syracuse, New York 13210. ●

KINOSTERNON FLAVESCENS SPOONERI (Illinois Mud Turtle). USA: IOWA: Lee Co: 5 km south of Montrose, 200 m west of Mississippi River. 18 June 1979. J. Millmeyer. Verified by R. Feuer and J. R. Jordan. Released after identification. New county record and extends range southward into Missouri. Captured crossing sandy farm road. Specimen was photographed, measured and the first marginal laminae was permanently marked by notching. (Brown, L. and Moll, D., 1979. Milwaukee Public Museum, Special Publ. No. 3).

Submitted by **J. RICHARD JORDAN**, Department of Wildlife and Fisheries Sciences, Texas A & M University, College Station, Texas 77843. ●

TRIONYX SPINIFERUS ASPERUS (Gulf Coast Spiny Softshell). USA: GEORGIA: Charlton Co: St. Marys River at Ga. Rt. 23; SE ¼ sec. 31, T1S, R22E; 4 Oct. 1979; H. W. Campbell, S. P. Christman, and FLORIDA: Nassau Co., St. Marys River, SW ¼ sec. 13, T1N, R23E; 20 Oct. 1979; S. L. Christman, S. P. Christman. Verified by Howard I. Kochman. Florida State Museum, UF 45477 and UF 45478, respectively. First records for the St. Marys River System and first records for Charlton Co., Georgia and Nassau Co., Florida. Southern range extension of approximately 125 km from previous southernmost known locality on the Atlantic Coast, the Altamaha River (Webb, 1962. Univ. Kansas Pub. Mus. Nat. Hist. 13 (10): 429-611; Webb, 1973. Cat. American Amphibs. Repts., pp. 140.1-140.4). The species is now known to occur in all major coastal rivers from the Pee Dee in South Carolina to the Rio Purificacion in Tamaulipas except for a gap which includes the Ochlockonee, Suwannee, and St. Johns rivers in Florida.

Submitted by **HOWARD W. CAMPBELL** and **STEVEN P. CHRISTMAN**, National Fish and Wildlife Laboratory, 412 NE 16th Avenue, Gainesville, Florida 32601. ●

LACERTILIA

EUMECES FASCIATUS (Five-lined Skink). USA: NEW YORK: Warren Co: 1.6 km WSW Sabbath Day Point, Bloomer Mountain. 12 and 26 May 1979. W. S. Brown and D. W. Pyle. Verified by R. G. Zweifel. Amer. Mus. Nat. Hist. (AMNH 118707) adult ♀; (AMNH 118708-118709) adult♂♂. Collected on south-facing slope in open talus rock deposits in mixed deciduous woodland, elev. *ca.* 200 m (♂, ♀) and in woodland on south-facing slope at *ca.* 400 m (♂). Two additional ♂♂ observed 21 May 1979 by Nancy L. Martin 1.6 km SW Sabbath Day Point, Warren County, New York, near Deer Leap on Tongue Mountain in talus rocks, elev. *ca.* 100 m. First records for county and for west side of Lake George. Extends range in northeastern New York 9.8 km SSW of Camp Sagamore, Washington County (Cornell Univ. 4052: Hamilton, 1947, Copeia 1947: 64) and 13.5 km SW of Putnam Station, Washington County (AMNH 87047), both prior known localities on east side of Lake George. In addition to the lake barrier between the Warren and Washington County localities in northeastern New York, a considerable hiatus (*ca.* 240 km) in range exists between the northeastern localities and known southeastern New York localities (Orange, Rockland, and Westchester counties - 7 specimens AMNH; Sullivan and Dutchess counties - range map in M. M. Stewart and J. Rossi, in press).

Submitted by **WILLIAM S. BROWN** and **DONALD W. PYLE,** Department of Biology, Skidmore College, Saratoga Springs, New York 12866. ●

PHRYNOSOMA CORNUTUM (Texas Horned Lizard). USA: ALABAMA: Mobile Co: Dauphin Island, on Dauphin Island Sea Lab property at extreme eastern end of the island. 15 October 1978. J. J. Dindo. Verified by W. A. Cox, Samford University. Specimen was photographed and released. Color slides of the specimen are on file in the Vertebrate Museum, Biology Department, University of Alabama in Birmingham. First record for county and coastal Alabama and second for state (Mount, 1975, The reptiles and amphibians of Alabama, Auburn U. Press).

Submitted by **KEN R. MARION** and **JOHN J. DINDO**, Biology Department, University of Alabama in Birmingham, Birmingham, Alabama 35294. ●

SERPENTES

CARPHOPHIS AMOENUS VERMIS (Western Worm Snake). USA: ARKANSAS: Drew Co: 11.3 km N Monticello on US Rt. 81. 29 September 1976. C.R. Tumlison. Verified by E. J. Bacon. Private collection of C. R. Tumlison

(#60). 8 km S Monticello (S19, T13S, R7W). 15 April 1977. R. W. Wiley. Verified by E. J. Bacon. University of Arkansas at Monticello Collection of Vertebrates (UAM 1505-1506). First specimens reported from SE Arkansas, extends known range *ca.* 150 km SE from the western area of the state (Dowling, 1957. Univ. Arkansas Mus. Occas. Papers, No. 3).

Submitted by **C. R. TUMLISON** and **R. W. WILEY,** Department of Biology, University of Arkansas, Monticello, Arkansas 71655. ●

NERODIA ERYTHROGASTER TRANSVERSA (Blotched Water Snake). USA: ARKANSAS: Cross Co: Village Creek State Park, T7N, R4E, Sec. 30. 16 April 1979. J. A. Huggins. Verified by W. W. Byrd and V. R. McDaniel. Arkansas State University Herpetol. Mus. (ASUHM #3749). First record for the county and extends the published range *ca.* 151 km SE of previous record from Lawrence County (Dellinger, S. C., and J. D. Black. 1938. Occ. Pap. U. Ark. Mus. (1): 1-47). Additional living individuals encountered; it appears this snake has expanded its range east from NW Arkansas localities and beyond the reported zone of intergradation with *Nerodia e. erythrogaster* (Dowling, H. G. 1957. Occ. Pap. U. Ark. Mus. 3: 1-51; Conant, R. 1975).

Submitted by **CHRIS T. McALLISTER,** Department of Biological Sciences, Arkansas State University, State University, Arkansas 72467. ●

DISTRIBUTION OF THE TAILED FROG, *ASCAPHUS TRUEI* STEJNEGER, IN SEVERAL DRAINAGES IN NORTHCENTRAL IDAHO

Ascaphus truei is a representative of a monotypic North American genus of frogs commonly referred to as the tailed frog. This entirely aquatic species is known from northern California, the coast range of Oregon, the Cascade Mountains of Oregon, Washington and British Columbia, the Olympic Peninsula of Washington and in several mountainous areas in western Montana and northern Idaho (Franz and Lee 1970; Metter 1964, 1968). Although works on the general distributions of *Ascaphus* are available (Metter 1968), little work on the specific distribution of this species in Idaho has been undertaken. The area included in our study was Idaho north of the Salmon River and south of the Coeur d'Alene River. Metter (1969) reported several occurrences within this area but did not specify occurrence within individual drainages.

Our study took place in several phases from 1967 to 1974. Extensive collections were made on the Clearwater, Palouse, and Coeur d'Alene Rivers. Supplemental collections were made in the St. Joe and St. Maries drainages. Most collections were made with backpack electrofishing units, using the technique outlined for collecting bottom fishes by Maughan (1972).

Tailed frogs were taken from 27 locations on the Clearwater River, 9 locations on the Coeur d'Alene River, 8 locations on the Palouse River, 7 locations in the St. Joe River and 2 locations on the St. Maries River (Figure 1). In addition, Metter (1978, personal communication) has taken *Ascaphus* from tributaries of Moose Creek and the Little North Fork Clearwater where we did not collect the species and from additional locations on the Lochsa ("Essentially all the small feeders to the Lochsa from ± 10 miles above its juncture with the Selway") and Palouse ("A small tributary coming off N. side of Moscow Mountain").

A. truei was widespread but spottedly distributed throughout the headwater areas of the streams sampled. However, *A. truei* was not found in all streams sampled. The spotty distribution may have resulted from previous local climatic conditions associated with glacial advance and retreat (Franz and Lee 1970) or from sampling bias, or from some unknown ecological factor associated with elevation. Virtually all populations encountered were above the 975 m elevation (3200 ft). Explanations for the restriction were not readily apparent.

Franz and Lee (1970) speculated that similar spotted distributions of *A. truei* in the flathead drainage in Montana resulted from refugial occupation during the Cordelleran Ice Sheet followed by secondary reinvasion as the ice sheet retreated. Secondary localized exterpations followed reinvasion as the result of warming trends accompanied by droughts and intermitant stream flows. This

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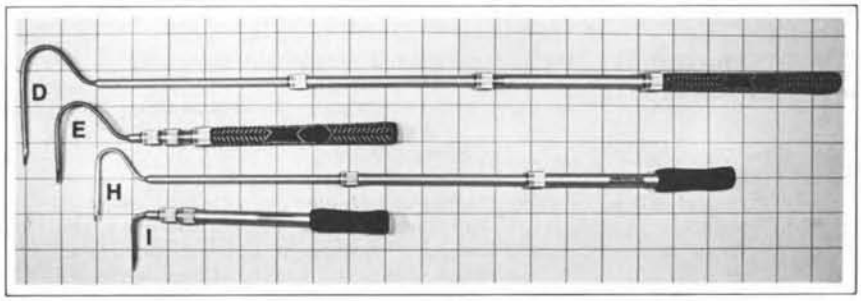
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hypothesis does not appear applicable to northern Idaho because adjacent creeks with similar climatic histories differ in their ability to support populations of *A. truei*.

The Pacific giant salamander, *Dicamptodon ensatus*, has a distribution similar to that of *A. truei*. Savage (1952) hypothesized that the discontinuity in the distribution of *D. ensatus* in the northern Rockies was not a real phenomenon. Maughan et al. (1976) substantiated this hypothesis and concluded that sampling bias was the cause of much of the apparent discontinuity. Based on our data the apparent discontinuity in the distribution of *A. truei* likewise appears to be partially an artifact of sampling.

Maughan et al. (1976) hypothesized that *D. ensatus* might be found south as far as the Bear River Drainage and north across a northerly boreal connection between the Rockies and the Cascades in the area of Wells Gray Provincial Park in Central British Columbia. We now believe this hypothesis applies also to *A. truei*.

LITERATURE CITED

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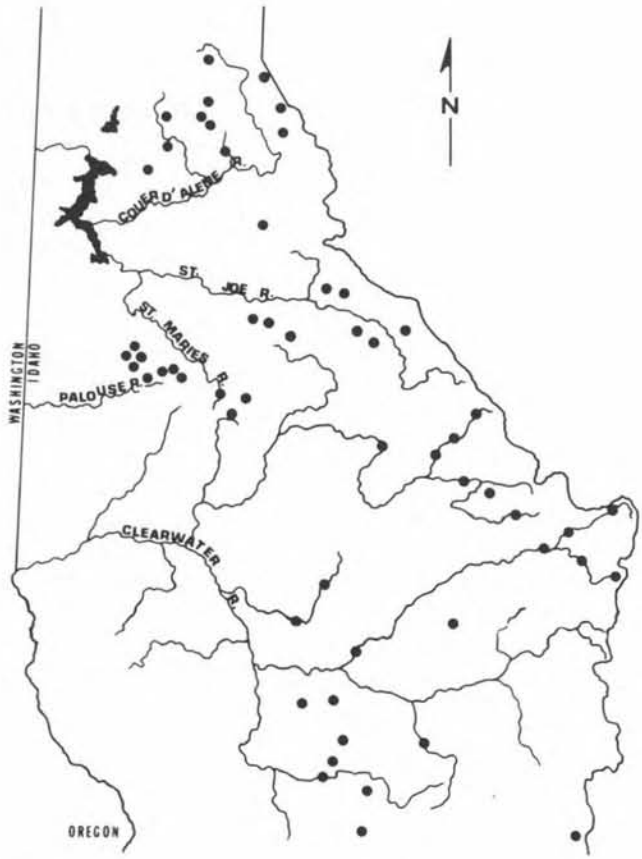
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Notes On The Occurrence Of Introduced Turtles In Arizona

Recently, Smith and Kohler (1968, Trans. Kansas Acad. Sci. 80:1-24) published a list of introduced amphibians and reptiles in the United States and Canada. The list indicates that only one species of turtle (*Trionyx spiniferus emoryi*) has been introduced to the state. In this paper I discuss five additional species or subspecies introduced to Arizona. Terminology for the status of the introduced forms follows that of Smith and Kohler. They define "endemic" as any species whose range enters into the political boundaries of the United States.

1 - Endemic Breeding Population Now In Existence (species that have successfully established breeding populations). To my knowledge only *Chrysemys scripta elegans* falls into this category. It is abundant in the ponds at Papago Park, Phoenix, Maricopa County and in the Gila River 5 mi SW of Buckeye, Maricopa County. Both of these locations have breeding populations of turtles. *Chrysemys scripta elegans* has been introduced to the state through the sale of hatchlings in pet and variety stores. At Papago Park individuals of all sizes, from hatchlings to large adults have been collected, suggesting that a breeding population is present. In addition, abdominal palpation confirmed the presence of oviducal eggs in several females. One road killed female from the Buckeye locality contained several shelled oviducal eggs. In the area around Phoenix these turtles are active throughout the year. Due to the complex system of irrigation canals and channels and the close proximity of these canals to the ponds at Papago Park it is likely that the turtles will spread their range to include the entire Salt River Valley.

2 - Endemic Released (releases are of sufficient magnitude and/or in areas of such favorable habitat that the establishment of breeding populations must be considered at least possible).

Chrysemys picta dorsalis has been introduced to Quitoboquito Spring, Organ Pipe National Monument, Yuma County. One immature female was collected in the spring. Park officials informed me that several individuals had been released into Quitoboquito by tourists. Quitoboquito Spring is excellent habitat for turtles and already supports populations of *Kinosternon sonoriense* and *K. fla-*

vescens (both native to Arizona). It appears that once the introduced *C. p. dorsalis* reach reproductive maturity they will establish a breeding population. The impact of these introduced turtles on the native species of *Kinosternon* remains unknown.

Chrysemys picta belli has been reported from Rock Creek Canyon, Navajo County by Yarrow (1875, Rept. Geograph. Geol. W. 100th Med., Chap. IV:509-584). Presumably this was a native population that has since been extripated. Several specimens of *C. p. belli* have been collected from the Papago Park ponds. The habitat at the ponds is adequate for the establishment of a breeding population. It remains to be seen if the numbers of *C. p. belli* are sufficient to such a population.

3 - Waif (Introductions of single specimens or two or more specimens of one sex in any area). One species, *Chelydra serpentina*, clearly falls into this category. A single individual of *C. serpentina* was found in a torpid state in the deserted fish hatchery at Papago Park. It is doubtful that any other specimens have been released.

Chrysemys scripta scripta is between category 2 and 3. A few specimens of this form have been found in the Papago Park Ponds, but the establishment of a breeding population is highly unlikely due to the small number of them in relationships to *C. s. elegans*, which are abundant in the ponds.

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CURRENT LITERATURE

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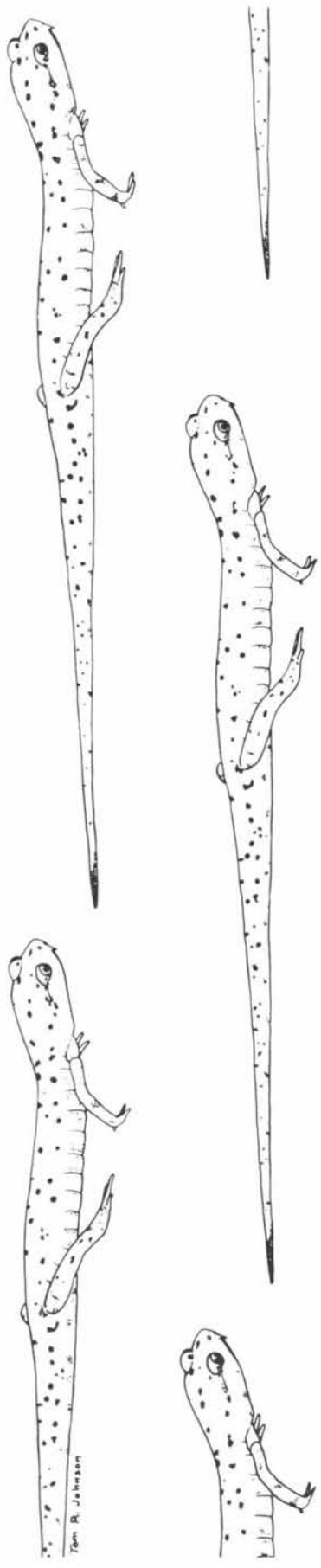
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Volume 10 **December 1979** **Number 4**

Contents

SSAR BUSINESS

Herpetological Review notes 106
SSAR Grants-in-Herpetology recipients 106
SSAR Kennedy Award 106
Titles of papers—22nd Annual Meeting 106-109
Report of SSAR common names committee 109, 110

REGIONAL SOCIETY NEWS

Directory of regional societies (updated) 110, 111

FEATURE ARTICLES

Herpetology at the Dallas Zoo, by James B. Murphy 111, 112
A winter surface observation of a redback salamander, *Plethodon cinereus*, in northern Ohio, by F. Kraus, Jr. and G. W. Schuett 112
Pure white rattlesnake, by W. B. and K. V. Love 113
Notes on the sexual behavior and the reproduction of *Teius teyou* (Lacertilia, Teiidae), by Eduardo Gudynas 113

HERPETOLOGICAL HUSBANDRY

Suggestions for the *post mortem* examination of reptiles, by John A. Shadduck and James B. Murphy 113-115
Captive reproduction in the scarlet kingsnake, *Lampropeltis triangulum elapsoides* (Holbrook), by Dennis W. Herman 115

NEW BOOKS 115

GEOGRAPHIC DISTRIBUTION

New records 118, 119
Texas amphibians and reptiles: some new distributional records, part II, by John P. Karges 119-121
Distribution of the Chilean lizard *Pristidactylus torquatus*, by R. M. M. Espinoza and J. R. Formas 121, 122

NEWS NOTES 122

LEGISLATIVE ALERT 122, 123

NEW DUTCH HERP GROUP 123

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SSAR BUSINESS

Herp. Review—"Whither Thou Goest" or "Goest and Wither"?

Herpetological Review has reached the point of having so many "must be published in **HR**" items that adherence to our budget while striving to present issues with a "balanced" content (those sections of **HR** such as distribution, husbandry, society news, feature articles, reviews, and—by far the largest—Current Literature) has become virtually impossible. Several possible solutions exist, and at this point I feel it is appropriate to ask you, the membership, your feelings. We could reduce the coverage of much of what we now try to include in each issue, while keeping things you most desire. Hence, how highly do **you** value our present sections? Current Literature is, I know, valuable. So is Distribution. So is . . . The Board could increase dues by yet another small increment and **HR** readers could have all sections held as is. Would that be supported? Would you subscribe to a separate Current Literature publication (quarterly issues—*ca.* 5.00 per year)? This is not really that desirable an option as it creates bookkeeping headaches for the Treasurer and Publications Secretary. Should SSAR sell **Herp. Circulars** rather than distribute them to all members free, and use what's now the Circulars' budget to improve Current Literature within **Herp. Review** (we could typeset it and double our present coverage—but services cost money)?

Unlike the Journal, which has a fairly well defined and closed coverage, **HR**'s coverage is loosely defined. The SSAR constitution mandates that we have all SSAR business as a first priority, and beyond that it's largely editor's discretion. So, before the editor swings his axe, some feedback would be greatly appreciated. Please do it **now** as volume 11 will soon be with us.

George Pisani, Editor

HR EDITORIAL CHANGES

Beginning with volume 11(1):

Bern Tyron (Reptile Dept., Fort Worth Zoo, 2727 Zoological Park Drive, Fort Worth, TX 76110) will replace Jim Murphy as Herpetological Husbandry section editor;

Joseph T. Collins (address on inside front cover) will replace Joe Mitchell as Geographic Distribution section editor; the new RHS committee chairperson will replace Tom Johnson as Regional Societies section editor;

Joseph T. Collins will no longer co-edit **HR**.

Please direct all Section-oriented manuscripts to the appropriate section editor. It saves handling (and hence, publication) time on your manuscript. The editor sincerely thanks all outgoing section editors, as well as the manuscript reviewers for volume 10 for their generous gift of time to **HR**. Special thanks are extended to Joseph T. Collins for his help the past few years with **HR**.

1979 RECIPIENTS OF SSAR GRANTS-IN-HERPETOLOGY

In 1978 the SSAR Board of Directors approved a Grants-in-Herpetology program. Its purpose is to financially support projects in four areas in which traditional sources of funding are not appropriate. Eight hundred dollars were budgeted for the first year, and an additional $100 were received from the Northern Ohio Association of Herpetologists, permitting four grants of $225 each.

Twenty-four proposals were received, including ten for graduate student research, three for zoo research, five for conservation, and six for regional society projects. These were carefully considered by a committee consisting of C. Kenneth Dodd, Martin J. Rosenberg, John Behler, Stephen R. Edwards, and Harry W. Greene. The following winners were announced at the annual meeting in Knoxville: **Linda S. Ford** (graduate student research, University of Texas at Arlington), Interspecific relationships among cloud forest *Eleutherodactylus;* **John D. Groves** (zoo research, Philadelphia Zoological Garden), The food and feeding behavior of the emerald tree boa, *Corallus canina;* **Norman G. Reichenbach** (conservation, Ohio State University), Ecology and management of the prairie garter snake, *Thamnophis radix,* in Ohio; and **Wisconsin Herpetological Society** (regional herp societies), Production of filmstrips for herpetological education.

On behalf of the SSAR, I extend thanks to the committee members for their time and efforts, to the Northern Ohio Association of Herpetologists for their contribution, and to all those that submitted proposals. At least $1100 will be available for the 1980 grants, and we hope to receive a large number of quality proposals in each of the four areas (see News Notes in this issue for details). In the future, annual dues envelopes will include a space for donations, and we encourage members to financially contribute to the growth of the SSAR Grants-in-Herpetology program.

Harry W. Greene
(Grants-in-Herpetology
Committee Chairperson)
Museum of Vertebrate Zoology
University of California
Berkeley, California 94720 ●

JUTERBOCK WINS 1979 SSAR KENNEDY AWARD

The 1979 SSAR Kennedy Award Committee has determined that the paper "Sexual Dimorphism and Maturity Characteristics of Three Species of *Desmognathus* (Amphibia, Urodela, Plethodontidae)," authored by J. Eric Juterbock, was the best student paper published in Volume 12 (1978) of the *Journal of Herpetology*. For his efforts the author was recognized and awarded a $100 check at the SSAR business meeting in Knoxville, Tennessee, on 15 August 1979.

I gratefully acknowledge the members of the 1979 Committee consisting of W. S. Brown, A. Channing, and J. D. Lynch for their efforts in this determination.

Michael V. Plummer, Chairperson
1979 Kennedy Award Committee ●

TITLES OF PAPERS PRESENTED AT THE 22ND ANNUAL MEETING OF THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES AT THE UNIVERSITY OF TENNESSEE, KNOXVILLE, 12-16 August 1979

Seasonal Vitellogenesis in Snakes.
Robert D. Aldridge (St. Louis University, St. Louis, Missouri)

Opportunistic Pathogenic Bacteria and Disease in the Cultured Bullfrog, *Rana catesbeiana.*
R. L. Amborski (Louisiana State University, Baton Rouge)
L. Riddle (Louisiana State University, Baton Rouge)
B. Thompson (Louisiana State University, Baton Rouge)
D. D. Culley (Louisiana State University, Baton Rouge)
G. F. Amborski (Louisiana State University, Baton Rouge)

Reproductive Effort of Female *Anolis limifrons.*
Robin M. Andrews (Virginia Polytechnic Institute and State University, Blacksburg)

Thamnophis couchi as a Single, Polytypic Species.
Stevan J. Arnold (University of Chicago, Chicago, Illinois)

Captive Maintenance of Live *Necturus lewisi.*
Ray E. Ashton, Jr. (North Carolina State Museum of Natural History, Raleigh)

Electrophoretic, Karyologic and Dentition Studies of *Necturus lewisi* (Brimley).
Ray E. Ashton, Jr. (North Carolina State Museum, Raleigh)
A. L. Braswell (North Carolina State Museum, Raleigh)
S. I. Guttman (Miami University, Oxford, Ohio)
R. Mobley (North Carolina State University, Raleigh)
J. Wiley (North Carolina State University, Raleigh)

Feeding Strategy of *Cyclura carinata.*
Walter Auffenberg (University of Florida, Gainesville)

The Courtship and Mating Behavior of the Blanding's Turtle, *Emydoidea blandingi.*
Randy E. Baker (Central Michigan University, Mt. Pleasant)

A Population Study of *Leptodactylus amazonicus* Tadpoles.
Thomas J. Berger (University of Kansas, Lawrence)

Sexual Selection and Evolution of Sexual Size Dimorphism in Turtles.
James F. Berry (Elmhurst College, Elmhurst, Illinois)

Aspects Biogeographiques du Peuplement de Madagascar en Iguanides.
(Biogeographical Aspects of the Colonization of Madagascar by Iguanas.)
Charles P. Blanc (Faculte de Medecine, Tunis)

Modalites de L'Evolution Des Iguanides Malgaches.
(Modalities of Evolution of Madagascan Iguanas)

Charles P. Blanc (Faculte de Medecine, Tunis)
Francoise Blanc (Faculte de Medecine, Tunis)

Thermal Regulation in Sleeping Aggregations and Sexual Dimorphism of the Marine Iguana (*Amblyrhynchus cristatus*).
P. Dee Boersma (Univ. Washington, Seattle)

The Mimetic Conflicts Involving *Notophthalmus viridescens* Efts, *Gyrinophilus porphyriticus*, and Species of *Pseudotriton*.
Ronald A. Brandon (Southern Illinois University, Carbondale)

Rattlesnakes in Search of Prey.
O. Greg Brock (Florida State University, Tallahassee)

Seasonal Abundance Patterns of Model and Mimic Salamanders.
Edmund D. Brodie, Jr. (Adelphi University, Garden City, New York)

Food Habits of the Anuran *Leptodactylus fallax*.
Garnett R. Brooks (College of William & Mary, Williamsburg, Virginia)

The Genera of Phyllomedusine Frogs.
David Cannatella (University of Kansas, Lawrence)

The Aggressive Displays of Iguanine Lizards and a Comparison to the Displays of Other Iguanid Lizards.
Charles C. Carpenter (University of Oklahoma, Norman)

Preliminary Results on the Ecology and Evolution of the Insular Gigantic *Sauromalus*.
Ted J. Case (University of California, San Diego)

Analysis of Courtship Behavior in the Burmese Python, *Python molurus bivittatus*.
Jeffery A. Chambers (Central Michigan University, Mt. Pleasant)
James C. Gillingham (Central Michigan University, Mt. Pleasant)

The Cranial Osteology and Evolution of the Tortoise Genus *Geochelone*.
Charles R. Crumley (Rutgers-The State University, Newark, New Jersey)

Evidence of Character Displacement Involving the Salamanders *Desmognathus fuscus fuscus* and *D. monticola*.
Robert D. Davic (Kent State University, Kent, Ohio)

Observations on the Wood Frog, *Rana sylvatica* LeConte, in Alabama.
Mark S. Davis (Auburn University, Auburn, Alabama)

Two Genetic Strategies in *Desmognathus*.
Norris Denman (Concordia University, St. Bruno, Quebec, Canada)

Preliminary Molecular Evidence on Relationships Within the Alligatoridae.
L. L. Densmore (Louisiana State University Medical Center, New Orleans)
Herbert C. Dessauer (Louisiana State University Medical Center, New Orleans)

The Effects of Cover Availability on the Movement Ecology of the Garter Snake, *Thamnophis s. sirtalis*.
John A. Dickinson (Central Michigan University, Mt. Pleasant)

Relative Abundance of Model and Mimic Salamanders in the Southern Appalachian Mountains.
C. Kenneth Dodd, Jr. (Office of Endangered Species, U. S. Fish & Wildlife Service, Washington, D. C.)

Orientation in Hatchling Green Iguanas.
Hugh Drummond (University of Tennessee, Knoxville)
Gordon M. Burghardt (University of Tennessee, Knoxville)

The Defensive Behavior of Salamanders in Response to Snakes.
Peter K. Ducey (Adelphi University, Garden City, New York)

Problems in the Evolution of Marsupial Frogs.
William E. Duellman (University of Kansas, Lawrence)

The Mating Behavior of the Green Iguana (*Iguana iguana*).
Beverly A. Dugan (University of Tennessee, Knoxville)

Socio-Ecological Determinants of Mating Strategies in Iguanine Lizards.
Beverly A. Dugan (University of Tennessee, Knoxville)
Thomas A. Wiewandt (University of Florida, Gainesville)

Current Status of Bullfrog Culture With Emphasis on Present Advances in Reproductive Control.
Kirk A. Easley (Louisiana State University, Baton Rouge)
D. D. Culley (Louisiana State University, Baton Rouge)

Effects of Embryonic Temperature on Hatchling Morphology of Some Turtles.
Michael A. Ewert (Indiana University, Bloomington)

Exploitation of *Iguana* and *Ctenosaura* in Central America.
Henry S. Fitch (University of Kansas, Lawrence)
Robert W. Henderson (Milwaukee Public Museum, Milwaukee, Wisconsin)
David M. Hillis (Baylor University, Waco, Texas)

Intra-and Interpopulation Variation in the Geotactic Behavior of the Red-Spotted Newt.
Don C. Forester (Towson State University, Towson, Maryland)
Steven P. Platania (Towson State University, Towson, Maryland)

Palatability of Amphibian Larvae to Aquatic Invertebrate Predators.
Daniel R. Formanowicz (State University of New York at Albany)

Mechanoreceptive Microornamentation in Gekkonids.
Kevin Fowler (University of Georgia, Athens)

Carapace Shape, Aggression and Galapagos Ecology: A Movie of Giant Tortoise Behavior.
Thomas H. Fritts (National Fish & Wildlife Laboratory, Tulane University, Belle Chase, Louisiana)

Electrophoretic Comparison of Serum Proteins of Three Species of *Nerodia* (Water Snakes).
Phyllis J. Garnett (University of Arkansas at Little Rock)

Routes of Aquatic Oxygen Uptake in Forcibly Submerged Snapping Turtles.
Robert E. Gatten, Jr. (University of North Carolina at Greensboro)
Steven R. Hanam (University of North Carolina at Greensboro)

On *Brachylophus* and a New South Pacific Iguanine: General Biology and Conservation.
Jogn R. H. Gibbons (University of the South Pacific, Suva, Fiji)

Patterns of Multiple Oscillation Tongue-Flicking in Snakes.
Doris Gove (University of Tennessee, Knoxville)

Effects of Seasonal Injections of Melatonin on the Reproductive Structures of the Male Lizard, *Anolis carolinensis* (Reptillia: Iguanidae).
Mark A. Grassman (University of Nebraska at Omaha)
James D. Fawcett (University of Nebraska at Omaha)

Social Interactions in Captive *Brachylophus fasciatus*.
Neil Greenberg (University of Tennessee, Knoxville)
Thomas A. Jenssen (Virginia Polytechnic Institute and State University, Blacksburg)

The Exploratory Behavior of *Anolis carolinensis*.
Neil Greenberg (University of Tennessee, Knoxville)
W. C. Rodriguez III (University of Tennessee, Knoxville)

The Adaptive Zone of Beaded Lizards (Helodermatidae).
Harry W. Greene (University of California, Berkeley)
Jacques Gauthier (University of California, Berkeley)

The Female Reproductive Cycle of *Sternotherus oderatus*.
Dena T. Gross (University of South Florida, Tampa)

Sequential and Spatial Patterning of Movements in Eastern Box Turtles (*Terrapene c. carolina*).
Stephen P. Hall (University of North Carolina at Chapel Hill)

Environmental Selection on Four Electrophoretic Loci in *Rana clamitans*.
P. G. Haneline (University of Pittsburgh, Pittsburgh, Pennsylvania)

The Breeding Migration of the Mole Salamander, *Ambystoma talpoideum* (Holbrook) (Caudata: Ambystomatidae) in Northwestern Louisiana.
Laurence M. Hardy (Louisiana State University in Shreveport)
Larry R. Raymond (Walter B. Jacobs Memorial Nature Center, Blanchard, Louisiana)

Ecology of the Green Iguana in Northern Colombia.
Dennis M. Harris (Peace Corps, U. S. Embassy, Bogota, Colombia)

Aquatic Prey Selection by Free-Living *Nerodia fasciata confluens* and *N. f. pictiventris*.

James J. Hebrard (University of Central Florida, Orlando)

Natural History of the Brown Water Snake, *Nerodia taxispilota*, in Central Georgia.
Bob Herrington (Oconee Research Laboratory, Milledgeville, Georgia)
Jack D. Batson (Oconee Research Laboratory, Milledgeville, Georgia)

Sensory Orientation in the Red-Spotted Newt, *Notophthalmus viridescens*.
James L. Hershey (Towson State University, Towson, Maryland)
Don C. Forester (Towson State University, Towson, Maryland)

Growth Rates and Age at Sexual Maturity for a Neotropical Salamander.
Lynne D. Houck (University of Chicago, Chicago, Illinois)

An Albino Seal Salamander (*Desmognathus monticola*) from Eastern Kentucky.
Wayne C. Houtcopper (Kentucky Nature Preserves Commission, Frankfurt)

Effects of Castration and Sex Steroid Replacement Therapy on Male to Male Aggression and Male Courtship Behavior in the Lizard *Anolis carolinensis*.
Judith C. Huang (Michigan State University, East Lansing)
James D. Fawcett (University of Nebraska at Omaha)

The Chemistry of Salamander Toxins.
James E. Huheey (University of Maryland, College Park)

Adaptations to Herbivory in Iguanine Lizards.
John B. Iverson (Earlham College, Richmond, Indiana)

Factors Effecting the Distribution and Abundance of Tadpoles in a Lowland Tropical Stream.
Alan P. Jaslow

Unusual Display Behavior by *Anolis grahami* (Sauria: Iguanidae) from Western Jamaica.
Thomas A. Jenssen (Virginia Polytechnic Institute and State University, Blacksburg)

The Wood Frog, *Rana sylvatica*, in Missouri.
Tom R. Johnson (Missouri Department of Conservation, Jefferson City)

Habitat Use in a Stream Salamander Community.
R. L. Jones (University of Tennessee, Knoxville)

A Reevaluation of *Eurycea aquatica* (Rose and Bush).
Thomas R. Jones (Auburn University, Auburn, Alabama)

Nesting Behavior in *Desmognathus fuscus*: Nesting Season and Nest Site Location.
J. Eric Juterbock (University of Ohio, Columbus)

Genetic Variation in *Desmognathus fuscus*.
Avlan A. Karlin (Tall Timbers Research Station, Tallahassee, Florida)
Sheldon I. Guttman (Miami University, Oxford, Ohio)

Prey Size Relationship in the Salamander *Desmognathus ochrophaeus*.
W. Hubert Keen (State University of New York at Cortland)

Home Range and Homing Behavior of *Plethodon cinereus* in Northern Michigan.
Steven R. Kleeberger (Kent State University, Kent, Ohio)
J. Kirwin Werner (Northern Michigan University, Marquette)

The Biology of the European Fire Salamander, *Salamandra salamandra*.
Konrad Klemmer (Natur-Museum Senckenberg, Frankfurt, West Germany)

The Reproductive Cycle in *Tropidoclonion lineatum*, the Lined Snake, in Missouri.
Randolph W. Krohmer (St. Louis University, St. Louis, Missouri)
Robert D. Aldridge (St Louis University, St. Louis, Missouri)

Natural Selection and Batesian Mimicry in *Desmognathus ochrophaeus* and *D. imitator*.
George M. Labanick (University of South Carolina at Spartanburg)

Intraspecific Aggression and Aggregative Behavior in the Pacific Pond Turtle, *Clemmys marmorata*.
Pere N. Lahanas (Auburn University, Auburn, Alabama)

Aspects of Feeding Ecology of the Pig Frog, *Rana grylio*, in South Georgia.
Trip Lamb (Auburn University, Auburn, Alabama)

Biochemical Genetics and Systematics of Garter Snakes of the *Thamnophis elegans-couchii-ordinoides* Complex.
Robin Lawson (California State University at Hayward)
Herbert C. Dessauer (Louisiana State University Medical Center, New Orleans)

Comparative Thermal Ecology of Two Lizards.
Julian C. Lee (University of Miami, Coral Gables, Florida)

The Identity of Hylopsis *platycephalus Werner* (Amphibia: Anura) and its Threat to Nomenclatural Stability.
John D. Lynch (University of Nebraska, Lincoln)

The Ecology of *Crotaphytus collaris* (Say).
Luis Malaret (University of Kansas, Lawrence)

Thermal Biology of *Podocnemis vogli* in the Venezuelan Llanos.
Scott J. Maness (California Academy of Sciences, San Francisco)
Dale L. Marcellini (National Zoological Park, Washington, D. C.)

The Effects of Handling on Hatching Success of Reptile Eggs.
Dale L. Marcellini (National Zoological Park, Washington, D.C.)

Preliminary Analysis of Comparative Cranial Morphology in Garter Snakes (Genus *Thamnophis*).
Kris H. Martin (Lehigh University, Bethlehem, Pennsylvania)

Life History of the Rattlesnake, *Crotalus horridus*.
W. H. Martin (U. S. Park Service, Spruce Pine, North Carolina)

Histological Characteristics of Cyclic Spermatogenesis in *Nerodia*.
Ellen Mattingly (University of Georgia, Athens)
Pat Fitzgerald (University of Georgia, Athens)

Albumin Evolution in Marsupial Frogs.
Linda E. R. Maxson (University of Illinois, Urbana)
William E. Duellman (University of Kansas, Lawrence)

The Hindgut Fermentation in *Iguana iguana*.
Richard H. McBee (Montana State University, Bozeman)

Thermoregulatory Influences on the Activity of *Sceloporus jarrovi*.
George A. Middendorf III (University of Tennessee, Knoxville)
Carol Simon (American Museum of Natural History and City College of New York)

Aerobic and Anaerobic Scope for Activity in the Giant Toad, *Bufo marinus*.
Kirk Miller (Franklin & Marshall College, Lancaster, Pennsylvania)

Surface Morphology of the Scales of the Western Slender Glass Lizard, *Ophisaurus attenuatus attenuatus*.
David M. Morton (University of Oklahoma, Norman)

Observations on the Captive Management of Urodeles.
Edward J. Moruska (Cincinatti Zoo, Cincinatti, Ohio)

Observations on the Captive Management of Anurans.
George W. Nace (University of Michigan, Ann Arbor)

Captive Management of Hellbenders, *Cryptobranchus alleganiensis*.
Max Allen Nickerson (Milwaukee Public Museum, Milwaukee, Wisconsin)

Water Relations of Flexible-Shelled Eggs of Common Snapping Turtles.
Gary C. Packard (Colorado State University, Fort Collins)
Theodore L. Taigen (Colordao State University, Fort Collins)
Mary J. Packard (Colorado State University, Fort Collins)
Thomas J. Boardman (Colorado State University, Fort Collins)

Structure of the Shell and Shell Membrane of Snapping Turtle Eggs.
Mary J. Packard (Colorado State University, Fort Collins)

A Comparative Physiological Study of Diving in Three Species of *Nerodia* and *Elaphe obsoleta*.
D. A. Baeyens (University of Arkansas at Little Rock)
M. W. Patterson (University of Arkansas at Little Rock)
C. T. McAllister (University of Arkansas at Little Rock)

Semen Collection and Analysis in Endangered Chelonians.
Carroll C. Platz, Jr. (Institute of Comparative Medicine, Baylor College of Medicine, Houston, Texas)
Greg Mengden (Houston Zoological Park, Houston, Texas)

Hugh Quinn (Houston Zoological Park, Houston, Texas)

Habitat Utilization in an Arboreal Snake *Opheodrys aestivus* (Reptilia: Colubridae).
Michael V. Plummer (Harding College, Searcy, Arkansas)

Amphibians and Reptiles from the Late Pleistocene of Puerto Rico.
Gregory Pregill (National Museum of Natural History, Washington, D. C.)

Anuran Cranial Osteology: Morphometric Analysis of Four Neotropical Species.
Rebecca A. Pyles (University of Kansas, Lawrence)

Captive Propogation and Reintroduction Program of the Houston Toad, *Bufo houstonensis*.
Hugh Quinn (Houston Zoological Gardens, Houston, Texas)
Greg Mengden (Houston Zoological Gardens, Houston, Texas)
John McLain (Houston Zoological Gardens, Houston, Texas)

An Iguanine Prolegomenon.
A. Stanley Rand (Smithsonian Tropical Research Institute, Canal Zone)

Geographic Variation in the Reproductive Biology of *Iguana iguana*.
A. Stanley Rand (Smithsonian Tropical Research Institute, Canal Zone)
Harry W. Greene (University of California, Berkeley)

The Lizard Forebrain: An Electron Microscope Study.
John Ranyard (University of Tennessee, Knoxville)
Neil Greenberg (University of Tennessee, Knoxville)

Movements and Habitat Utilization of the Massasauga, *Sistrurus catenatus catenatus*, in Pennsylvania.
Howard K. Reinert (Lehigh University, Bethlehem, Pennsylvania)

Seasonal Incidence of Snakes in Northeastern Chihuahua, Mexico.
Robert P. Reynolds (National Fish & Wildlife Laboratory, University of New Mexico, Albuquerque)

Evaporative Water Loss in *Kinosternon hirtipes* and *Kinosternon flavescens*.
Michael E. Seidel (Marshall University, Huntington, West Virginia)
Samuel L. Reynolds (Marshall University, Huntington, West Virginia)

Tooth Morphology in Crayfish-Eating Snakes, Genus *Regina*.
N. Nan Rojas (University of South Florida, Tampa)
J. Steven Godley (University of South Florida, Tampa)

Biochemical Systematics of Old and New World Natricine Snakes.
Michael A. Romano (University of Vermont, Burlington)
C. William Kilpatrick (University of Vermont, Burlington)

Relationships of the *Thamnophis couchii* Complex in Northern California.
Douglas A. Rossman (Louisiana State University, Baton Rouge)
Genn R. Stewart (California State Polytechnic University, Pomona)

Variation in Iguanine Social Organization: Mating Systems in the Genus *Sauromalus*.
Michael J. Ryan (Cornell University, Ithaca, New York)

Thermal Preference in Snapping Turtles (*Chelydra serpentina*).
Gordon W. Schuett (University of Toledo, Toledo, Ohio)
Robert E. Gatten (University of North Carolina at Greensboro)

Resource Partitioning Among Scincid Lizards in American Samoa.
Terry D. Schwaner (Louisiana State University Medical Center, New Orleans)

A Preliminary Systematic Investigation of the Scent Gland Secretion Lipids of *Nerodia* (Colubridae).
Leroy M. Scudder (University of Tennessee, Knoxville)
Peter D. Oldak (Boston University, Boston, Massachusetts)

A New Species of Desmognathus From the Southern Appalachians.
Stephen G. Tilley (Smith College, Northampton, Massachusetts)
Paula M. Schwerdtfeger (Smith College, Northampton, Massachusetts)

Batesian Mimicry and the Erythristic Phase of *Plethodon cinereus*.
Stephen G. Tilley (Smith College, Northampton, Massachusetts)
Barbara L. Lundrigan (Smith College, Northampton, Massachusetts)
Lincoln P. Brower (Amherst College, Amherst, Massachusetts)

Population Dynamics and Seasonal Recruitment in *Bufo typhonius* and *Colostethus nubicola* (Anura) on Barro Colorado Island.
C. A. Toft (University of California, Davis)
A. S. Rand (Smithsonian Tropical Research Institute, Canal Zone)
M. Clarke (University of California, Davis)

Geographic Variation in and Systematics of the Lizard *Cnemidophorus sexlineatus* (Lacertilia: Teiidae) in the United States.
Stanley E. Trauth (Auburn University, Auburn, Alabama)

An Advance in Herpetology.
Ronald L. Tremper (Fresno Zoo, Fresno, California)

A Frog-Eating Bat and its Probable Impact Upon Calling Frogs.
Merlin D. Tuttle (Milwaukee Public Museum, Milwaukee, Wisconsin)

Observations on the Ecology and Thermal Biology of *Echinosaura h. horrida* (Reptilia: Sauria: Teiidae) in Western Ecuador.
Gregory O. Vigle (Eckerd College, St. Petersburg, Florida)

Lizard Reproduction: Habitat Specificity and Constraints on Relative Clutch Mass.
Laurie J. Vitt (University of Michigan, Ann Arbor)

Status of the Emydine Turtle Genera *Chrysemys* and *Pseudemys*.
Richard C. Vogt (Carnegie Museum, Pittsburgh, Pennsylvania)
C. J. McCoy (Carnegie Museum, Pittsburgh, Pennsylvania)

Toad Tadpoles School With Siblings.
Bruce Waldman (Cornell University, Ithaca, New York)

Thermal Preferenda, Maxima and Minima of Sympatric Water Snakes.
Mary G. Walley (Louisiana State University, Baton Rouge)
Henry R. Mushinsky (Louisiana State University, Baton Rouge)

Husbandry and Breeding of *Corallus canina* at the National Zoological Park.
Trooper Walsh (National Zoological Park, Washington, D. C.)

Maternal Behavior of the American Alligator in a Natural Habitat.
Myrna E. Watanabe (New York University, New York, New York)

Chemical Recognition of Ophiophagus Snakes by Crotaline and Colubrid Snakes.
Paul J. Weldon (University of Tennessee, Knoxville)

Preliminary Results on the Social Structure and Ecology of *Conolophus subcristatus* (Iguanidae) on Fernandina Island, Galapagos.
Dagmar I. Werner (Charles Darwin Foundation for the Galapagos Isles)

The Cloacal, Integumentary, and Mental Hedonic Glands of *Hemidactylium scutatum*.
Albert A. Williams (University of Wisconsin, Milwaukee)

Evolution of Predator Defense Mechanism Among Three Species of Salamanders.
H. Patrick Wooley (East Central College, Union, Missouri)

REPORT OF THE SSAR COMMITTEE ON COMMON AND SCIENTIFIC NAMES FOR 1979

This report is the second annual update prepared by the SSAR Committee on Common and Scientific Names for North American amphibians and reptiles (north of Mexico). This report (and future reports) is compiled to fulfill the charge to our committee to keep the herpetological community informed of published taxonomic shifts and new descriptions, and to propose or record new common names brought about by same. In addition, this second update permits us to record recent changes overlooked and not included in "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" (Collins *et al.*, 1978).

The proposed changes and taxonomic shifts listed below are in order as they appear in our Common and Scientific Names list (Collins *et al.*, 1978).

PAGE 5, genus *Batrachoseps:* Marlow *et al.* (1979) described *Batrachoseps campi* with the common name "Inyo Mountains Salamander." This new species should be listed appropriately.

PAGE 8, genus *Plethodon:* Duncan and Highton (1979) described *Plethodon fourchensis* with the common name "Fourche Mountain Salamander." This new species should be listed appropriately.

PAGE 8, line 11: Guttman *et al.* (1978) proposed that *Plethodon longicrus* be placed in the synonymy of *Plethodon yonahlossee.*

PAGE 8, genus *Plethodon:* Highton (1979) described *Plethodon websteri* with the common name "Webster's Salamander." This new species should be listed appropriately.

PAGE 10, line 8: Duellman (1977) created a new combination by placing *Acris gryllus paludicola* as a subspecies of *Acris crepitans.* The common name remains the same.

PAGE 11, line 38: Heyer (1978) placed *Leptodactylus labialis* in the synonymy of *Leptodactylus fragilis.* The common name remains the same.

PAGE 12, genus *Rana*: Platz and Mecham (1979) described *Rana chiricahuensis* with the common name "Chiricahua Leopard Frog." This new species should be listed appropriately.

PAGE 16, line 12: Iverson (1979) changed *Kinosternon flavescens stejnegeri* to *K. f. arizonese.* The common name remains the same.

PAGE 19, line 15: Cox and Tanner (1977) considered the genus *Cophosaurus* as a synonym of *Holbrookia.* The common names remain the same.

PAGE 19, line 27: Sanborn and Loomis (1979) elevated *Crotaphytus insularis bicinctores* to specific status as *Crotaphytus bicinctores.* The common name remains the same.

PAGE 33-34, genus *Sonora:* Frost and Van Devender (1979) proposed that *Sonora episcopa* be placed in the synonymy of *Sonora semiannulata,* and that no subspecies be recognized. The common name of *Sonora semiannulata* becomes "Ground Snake."

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HERPETOLOGY AT THE DALLAS ZOO

The exhibition of reptiles and amphibians at the Dallas Zoo was initiated rather primitively with the incarceration of a few boa constrictors, a large reticulated python, and a couple of common iguanas. It was a testament to the apparent hardiness of some captive reptiles that these creatures survived for any time at all. Since it was obvious to the Zoo staff that even this paltry assemblage provoked keen public interest, plans were undertaken to develop a comprehensive collection of reptiles and amphibians which would be housed in a modern facility. In honor of the late Director of the Dallas Zoo, the Pierre A. Fontaine Bird and Reptile Building was opened on 4 July 1966. Admittedly the initial task of developing a staff, planning exhibits, and acquiring the animals was arduous, but the Department of Herpetology gradually became an integral part of the Zoo scene.

A large desert ecological exhibit with North American reptiles, especially lizards, has recently been constructed in the front of the building. This enclosure includes live plants and a hibernaculum.

The building houses reptiles, amphibians and tropical birds in naturalistic surroundings. One of the most impressive exhibits is the walk-in rain forest with free-flying birds. Approximately one-hundred exhibits of herpetofauna are available to the visitor and all are presented in elaborate settings which try to duplicate the microhabitats of the taxa within. Extensive use of live and plastic plants, ornamental rock dioramas and graphics hopefully contribute to the overall impression that reptiles and amphibians are beautiful creatures, equipped to survive in a hostile environment. The size of the collection remains rather constant with approximately 300 taxa and 780 individuals. Many are maintained "behind the scenes," due to inability to adapt to the stress of exhibition and for breeding purposes; in addition, since reproduction has been successful, large numbers of young are being raised. Annual mortality has averaged 12% since inception of the Department. Approximately 85 taxa of viperids, 15 varanids and over 60 lizard taxa from other families, 25 boids, 25 colubrids, and 35 chelonians accent



Fig. I. The Pierre A. Fontaine Bird and Reptile Building showing the recently completed exhibit which houses herpetofauna from desert regions of the United States. All photos by David G. Barker.



Fig. 2. A view of the exhibit area of the Pierre A. Fontaine Bird and Reptile Building.



Fig. 3. View of the work area. Exhibit units are on the left.

the collection. Breeding groups are maintained whenever possible and for the first time in the history of the Department, during 1978, reproduction has surpassed attrition through death.

Nearly forty taxa reproduced during a 15 month period. Notable captive births or hatchings for the last few years include the following: *Lampropeltis zonata, L. triangulum arcifera, L. t. amaura, L. t. sinaloae, L. t. ssp., Elaphe bairdi, E. subocularis, E. obsoleta lindheimeri, Liasis childreni, Liasis boa, Epicrates fordi, E. angulifer, Python timoriensis, Candoia bibroni, Crotalus w. willardi, C. adamanteus, C. atrox (albino), C. t. triseriatus, C. t. aquilus, C. lepidus klauberi, C. m. mitchellii, C. m. stephensi, C. pusillus, C. molossus nigrescens, Bothrops godmani, B. nigroviridis aurifer, B. neuwiedi, B. nummifer occidduus, B. n. nigroviridis, Trimeresurus popeorum, Varanus gilleni, V. prasinus, Sauromalus obesus, Sceloporus cyanogenys, S. jarrovi, S. orcutti, Callisaurus draconoides, Dipsosaurus dorsalis, Cnemidophorus tigris, Platysaurus intermedius, Hemitheconyx caudicinctus, Phelsuma abbotti, Phelsuma lineata, Phelsuma madagascariensis, Pachydactylus bibroni, Geoemyda trijuga thermalis, Dendrobates auratus* and *Gekko gecko.*

Geochelone radiata and *Crotalus durissus tzabcan*, placed on breeding loan at the Gladys Porter and Ft. Worth Zoos respectively, have also reproduced. Other breeding loan arrangements have been in effect with the Brookfield, Cincinnati, Houston, Jacksonville, Los Angeles, Lufkin, Memphis, Bronx, Philadelphia, Oklahoma City, San Antonio and Tulsa Zoos.

A large hibernation room has been constructed in order to elicit reproduction from Temperate Zone taxa.

Research, especially regarding behavior, reproduction, and husbandry has accelerated in recent years. Attempts are made, in conjunction with Charles C. Carpenter of the University of Oklahoma, to document behaviors on videotape and film. Joint research projects are currently in effect with colleagues at the University of Texas at Arlington, Southwestern Medical School (a branch of the University of Texas), University of Kansas, University of Florida, Brooklyn College, and various zoological gardens. To date, nearly fifty contributions have been published by members of the Department. Through the generosity of colleagues, many living specimens have been deposited with the understanding that the animals be preserved upon death. Specimens have been placed by Tom Van Devender (University of Arizona), Wayne Van Devender and Arnold Kluge (University of Michigan), John Wright (Los Angeles County Museum) and Wayne Seifert (Dallas Museum of Natural History). Jonathan A. Campbell and Barry L. Armstrong have deposited an extensive collection of rare Mexican and Central American reptiles and amphibians, including nearly 40 taxa of pit vipers. To these generous colleagues, heartfelt thanks are extended.

Specimens upon death are rarely discarded. Those which are accompanied by locality data or are vouchers are placed in a systematic museum collection. Others without data, including those necropsied, are provided to institutions for study purposes. The staff is especially pleased to offer the facilities to researchers who are doing ethological or other research. Examples of research which has been accomplished include constricting behavior in boids and colubrids, reaction of pit vipers to kingsnake skin secretions, agamid feeding behavior, analysis of shed skins with the use of scanning electron microscopy, turtle righting reflexes, ophiophagous snake feeding behavior, collection of microorganisms and endoparasites, feeding behavior in rattlesnakes, gekkonid behavior, karyology and the inclusion of specimens in various taxonomic studies. Biologists in the region have regularly offered a tour of the facility as an adjunct to class work for students.

Many photographers have used the facility and nearly all rare herpetofauna have been photographed for a permanent record.

It is the intention of the staff of the Department of Herpetology to develop a continual multifaceted approach to zoo herpetology, namely, to maintain reptiles and amphibians successfully in attractive exhibits, provide an educational experience for the zoo visitor, encourage reproduction, document behavioral patterns, improve husbandry techniques, stimulate inter-institutional programs and most importantly, become a reservoir for endangered species.

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A WINTER SURFACE OBSERVATION OF A REDBACK SALAMANDER, *PLETHODON CINEREUS*, IN NORTHERN OHIO

Several authors have reported of the hibernacula of *Plethodon cinereus* (Hoff, 1977; Taub, 1961; Vernberg, 1953). Most reports indicate that hibernacula are located beneath the soil surface in a variety of habitats (below tree stumps, in ant mounds, near woodchuck burrows). However, Cooper (1956) reports an aquatic hibernaculum.

On 17 December 1977, a search of a known locality for *P. c. cinereus* in Lucas County, Ohio revealed a single specimen of the lead-backed color phase (total body length 6.5 cm) under a fallen log on a southward-facing slope at 0750h. The individual made no attempt to escape, although it did move in a slow, coordinated manner when touched. Air temperature, recorded immediately with a previously-calibrated mercury thermometer, was 1°C. Soil in this locality is sandy with leaf litter. Oaks (*Quercus* sp.) are the predominant vegetation. Snow cover was present at depths varying from 1.5-3.0 cm.

Taub (1961) stated that *P. cinereus* in New Jersey were never found at the ground surface at air temperatures below 4° C. Vernberg (1953) found that the lowest surface temperature tolerated by Indiana specimens of *P. cinereus* in an outdoor artificial hibernaculum was 4° C. Soil temperature near salamanders which had burrowed into the substrate was 3°C. Hoff (1977) found 86 hibernating *P. cinereus* in Massachusetts beneath stumps of recently-cut white oaks. Soil temperature was 5-9°C and activity was observed in all individuals.

The present observation represents a marginally different surface temperature at which *P. cinereus* has been recorded as capable of coordinated movement.

We wish to thank Dr. Robert E. Gatten, Jr. for his assistance in the preparation of this manuscript.

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PURE WHITE RATTLESNAKE

An aberrant female specimen of Eastern Diamondback Rattlesnake, *Crotalus adamanteus* was collected as a 20" juvenile, displaying only the first button, crossing a road approx. 3 miles N. W. of Palm City, Martin County, Florida, on September 19, 1975. She was given to the authors and raised by them since. Nearing 4 years of age, she measures 55" and is still in perfect health.



"Snowflake" apparently lacks all pigment, though the iridophores probably account for the bluish-grey color surrounding the iris and the prismatic luster of her scales after a shed. As a juvenile, she had a pinkish cast due to the somewhat transparent scales and skin, but now she looks pearl white since the scales have enlarged and thickened. No trace of pattern is visible. Blood vessels can clearly be seen below the skin when a meal distends her.

Two other specimens exhibiting this type of aberrancy have been seen by the authors; a Texas Rat Snake, *Elaphe o. lindheimeri*, at the Houston Zoo, Texas, and a Cobra, *Naja naja*, at the Black Hills Reptile Gardens, South Dakota. Plans are to breed "Snowflake" in an attempt to learn how this aberration is inherited.

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NOTES ON THE SEXUAL BEHAVIOR AND THE REPRODUCTION OF *TEIUS TEYOU* (LACERTILIA: TEIIDAE)

Teius teyou is a common Uruguayan species found not only in rocky areas but in sandy zones as well. As the sexual behavior of teiids is poorly known, and as little information is available on the reproduction of this species, the following notes may be of interest.

These observations were made on December 12, 1977, in a sandy area with shrubby vegetation (*Acacia longifolia*) at Canelones Department, Uruguay. A big male was observed walking slowly among the shrubs. Tongue flicks were occasionally directed at the ground. Minutes later, the male started to follow a nearby female. She attempted to move away, but the male pursued, biting her on the dorsum, sides and extremities. The female would free herself, and again retreat. I observed a repeated succession of retreats by the female, accompanied by pursuit and biting by the male. The couple moved several meters during this activity.

The male on one occasion mounted the female and bit her behind the neck. The female remained motionless, and the male bit her dorso-lateral zone, ahead of one of her hind legs. The male moved his trunk and kept his body close to the female's. His cloacal region was in a vertical position. The female moved her body so her cloaca was near the male's, and copulation commenced. The male everted both hemipenes, although only one was utilized. As copulation concluded, the female moved away.

The male then started some post-copulatory activities. He stretched his hind legs, so his cloaca was elevated above the ground. He then retracted his hemipenes, and dragged his cloacal zone on the ground; he also rubbed his lips against the ground and the nearby vegetation. He remained motionless for some minutes, basking, and then walked slowly between the shrubs to about 100 m from the place where copulation took place.

Carpenter (1962) and Müller (1971) described the sexual behavior of *Cnemidophorus sexlineatus* and *C. lemniscatus* respectively. Their observations are similar to these on *T. teyou*. The male I observed did not do any pre-copulatory rubbing. The walking and the exploration of the ground displayed by this male just before copulation has been observed in this species only in this case. This suggests that this behavioral unit is related to sexual behavior. The mount also present in *C. sexlineatus* and *C. lemniscatus* (Carpenter, 1962; Müller, 1971) could be the unit necessary to go from the reiterated pre-copulatory phase to the copulatory one.

Copulations were observed from late October to early December. In November, eggs have been found in *Acromyrmex* ant hills (Vaz-Ferreira, *et al.*, 1970). I have observed a clutch of 8 eggs under a rock (49 x 26 cm, and 15 cm high) at Valle Edén, Tacuarembó Department. The eggs were buried, and only one was visible. A complicated channel system was found under the rocks around the nest. In seven measured eggs, the long axis ranged from 20.0 to 16.9 mm ($\bar{x}$ = 10.3 mm), and the short axis from 12.0 to 14.1 mm ($\bar{x}$ = 13.2 mm). These values are different from those reported by Vaz-Ferreira, *et al.* (1970), who found that 21.4 mm was the minimum long axis and 13.3 mm was the minimum short axis observed. Eight is also a new maximum record of eggs in a clutch.

T. teyou is unique among the lizards of Uruguay as it optionally lays eggs in ant hills or under rocks. It is also apparently a K-strategist species: it is a large, long lived lizard, and a presumed single-brooded species. The eggs laid in ant hills are in a favorable environment, with fairly constant temperature, high humidity and the absence of harmful fungus. The eggs under rocks are affected by the great variations of temperature and rain of the Uruguayan summer. There is no data on nest predators.

It could be assumed that those genotypes that lay their eggs in ant hills could be favored over those that lay their eggs under rocks. This duality in nest site appears to be an interesting topic for future research.

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HERPETOLOGICAL HUSBANDRY

SUGGESTIONS FOR THE *POST-MORTEM* EXAMINATION OF REPTILES

Collections of living reptiles are unique and valuable biological resources. The purpose of this paper is to encourage herpetologists to enhance the value of this resource by obtaining useful data following the death of any specimen.

Why perform necropsies or "What can be learned from a dead snake?"

Death is the inevitable outcome of life. Too often, we use this truth as an excuse for failing to derive any information from specimens in reptile collections "after the fact." A careful *post-mortem* examination (necropsy) can provide the interested curator and herpetologist, as well as the scientific community at large, with valuable data, much of which is immediately applicable to the living collection. Among other things, a necropsy may provide data on:

1) The cause of death;

2) The existence of infectious diseases which may threaten other specimens;

3) The existence of intercurrent or clinically silent diseases which may not be fatal, but which sap vitality, reduce the fecundity and otherwise, affect the health, value and appearance of specimens;

4) Correlation of clinical signs and tissue changes—Adequate clinical care of ill animals simply cannot be provided if no one knows, for example, what the possible causes of abdominal distension in snakes are; how rapidly each may progress; which occur most frequently; what the effects of the treatment were, etc.;

5) Efficacy of treatment—If we treat an animal for some clinical condition and it dies, the treatment was obviously no good and should not be used again - or should it? Did the specimen die of the condition for which it was being treated? Was the clinical diagnosis both correct and complete? Necropsy may provide at least partial answers to these and similar questions;

6) Incidence of various types of diseases in captive reptile collections—This endeavor is no less important than the short-term studies, but requires the help and cooperation of many collections to compile adequate statistics. One current effort in this area is the Registry of Tumors in Lower Animals at the Smithsonian Institution. Help yourself and help your colleagues by contributing to these collections.

One final plea for the necrospy: it provides us all an opportunity to refresh and add to our knowledge of normal anatomy and even to determine what "normal" anatomy is in some of the more exotic specimens. All too often, normal tissues are submitted to laboratories identified as "worms," "tumors," etc. It is appalling to think how many lesions may be dismissed as "normal"!

What are the objectives? or "I cut up the carcass just like you said and I didn't learn anything!"

The necropsy can provide reams of valuable and useful information, but not without a little foresight. Before anything at all is done with the animal, the investigator must decide what goals are to be achieved by the necropsy and how these goals rank in importance. The goals cannot be achieved without adequate advance preparation. The following table provides some examples.

PROBLEM OR QUESTION	GOAL	BE PREPARED TO
Infectious disease suspected	Identify causative agent.	Collect samples aseptically; provide samples to lab and/or identify agent(s); provide appropriate storage if necessary.
Chemical agent suspected	Identify causative chemical.	Collect proper fluids or tissue in appropriate containers; provide means to identify suspected chemical; store sample properly.
Confirm clinical interpretation	Account for each major clinical sign; assess effects of treatment; render diagnosis.	Examine each organ systematically; collect appropriate specimens for more detailed study (*e.g.* - fixed tissue for histopathology).

If a suspected disease is under study by a central registry, provide specimens and other documentation adequate for the purposes of the registry collection. Give detailed descriptions of autopsy findings. Document with photographs. Collect specialized materials, (*e.g.* fix tissues for electron microscopy; collect living cells for tissue culture).

If the dead animal is unusual enough to warrant further taxonomic study, preserve the specimen so that accurate taxonomic data can be obtained. Identify and preserve key organs or tissues required for accurate taxonomic classification. Accurately record findings which cannot be preserved.

Some Suggested Techniques or "There's More Than One Way To Shell a Turtle."

A necropsy is a systematic examination of body organs and tissues following death. A little attention to technique will make the whole thing go smoother and easier. Some suggestions for performing a necropsy follow. Obviously, the goals of the necropsy may dictate some changes in the approach. These suggestions provide a starting point.

Some cardinal necropsy rules are:

1. DON'T WAIT - Spoiled tissues are no help to anyone.
2. BE PREPARED - Sterile equipment, culture media, preservatives, arrangements with consultants, etc. all require forethought. Do it now.
3. FREEZING RUINS TISSUES for microscopic study. Hold dead animals at refrigerator temperatures. Do the necropsy promptly. A frozen carcass *may* be acceptable for preservation of infectious or chemical agents of disease. Check with your lab or an appropriate reference to confirm this for the agents you suspect.
4. PICK and RANK the GOALS.
5. HAVE A PLAN - Why are you doing the necropsy? Which goal is the primary one and which are secondary ones? You can usually achieve more than one objective -especially with a little foresight.
6. Take notes and write it all down.
7. Save samples of ALL major organs and tissues.
8. Use sharp instruments.
9. Cut thin (2-4 mm) pieces of tissue with a SHARP BLADE (not scissors) for fixation.
10. Use 10 to 20 times as much formalin as you have tissue. Use neutral buffered formalin if at all possible.
11. Label and date ALL containers.
12. Store properly.

The Basic Necropsy Procedure may be performed as follows:

1) Examine the entire body, this includes all body openings, body coverings, eyes, oral cavity (be careful with the fangs of venomous snakes), cloaca, penis, etc. Look into and under scales, skin folds, shell crevices, eyelids, etc. Look for blood, discharges, foreign bodies, parasites, food, wounds, etc. The shell of turtles should be specifically examined for cracks, separations and other evidence of injury.

2) Lay the body on its back and make a midline incision through the skin from the end of the lower jaw all the way to the posterior end of the body cavity. If a specimen is to be saved for museum study, cut at juncture of ventrals with dorsals. Carefully remove the skin from the ventral and lateral body walls. Carefully describe any lesions associated with the skin or shell and remove those lesions along with the skin. Observe the condition of the muscle and subcutaneous tissue. Now cut through the ventral body wall itself and expose the body cavity. The plastron and carapace of turtles should be separated at the bridge with a butcher saw, coarse bladed hacksaw or bone cutters. The plastron is then removed by cutting the underlying muscle to reveal the pleuro-peritoneal space. Cut the sternum at the costochondral junctions and sever the pectoral and pelvic girdles.

3) The usual time for collecting samples for microbiology, chemistry, hematology, etc. is now. Collect the specimens for microbiology carefully. Choose both obviously abnormal and normal areas of the organ(s) being sampled and collect the "cleanest" organ system first (e.g.-collect a specimen of lung before collecting intestine).

4) During the entire necropsy, look for changes in: anatomic position, sizes of organs and tissues, shape, color and consistency of organs and tissues. Look for the presence of exudates, excessive fluid, hemorrhage, discharges, foreign materials, parasites, etc.

5) Identify and remove the thyroid, parathyroid and thymus glands. Some review of normal anatomy will be helpful since there are often marked differences in location among various species of reptiles.

6) Start with the larynx and remove the cardiopulmonary system in one unit by dissecting away the soft tissue of the pharynx, tongue and esophagus. Examine the tissues. Open the lungs by opening the major bronchi with scissors. Open and examine the heart chambers and great vessels.

7) Identify the liver and gall bladder. Before removing, open the segment of intestine into which the bile duct drains and put slight pressure on the gall bladder. Free flow of bile indicates an open bile duct. Remove liver and gall bladder. Make multiple slices through the liver and look at the cut surfaces.

8) Remove and examine the spleen. Make multiple incisions through the organ and examine the cut surfaces. (If the spleen and pancreas are intimately attached defer and remove both together in step 10.)

9) Identify, remove and examine the genital system.

10) Remove the digestive system by dissecting the tongue free of its muscular and fascial attachments and remove tongue, esophagus, stomach and intestine to the cloaca. Observe the pancreas and dissect it free of the intestine after probing the pancreatic duct. Open the gastrointestinal tract and observe the contents and the mucosal surfaces at all levels.

11) Identify and remove the adrenals.

12) Remove the kidneys, ureters and cloaca. Probe the ureters for patency and make multiple incisions through the kidneys.

13) Examine the body cavity and remove segments of muscle covered with mesothelium (the lining of the cavity).

14) Open and explore the nasal cavity and sinuses.

15) Lay the body on the ventral surface and

remove the rest of the skin. Save a portion of skin (save it all if rare).

16) Remove both eyes and orbital contents. Dissect the globes free of muscle, fat, glands, etc. but do not open them.

17) Cut through the dorsal vertebral arches and the skull. Remove the brain, pituitary and spinal column. Do not slice these tissues until they have fixed 24-48 hours.

18) Open and examine the marrow cavity of at least one long bone. Save at least one bone with marrow and a joint surface still attached.

19) Incise the skeletal muscles and open at least some major joints. Examine the vertebral column and the appendicular skeleton.

CONCLUSION

Necropsy of specimens is a highly rewarding activity with many immediate and long term benefits. Foresight, a plan and some practice will result in a high yield of valuable data and deep personal satisfaction.

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CAPTIVE REPRODUCTION IN THE SCARLET KINGSNAKE, *LAMPROPELTIS TRIANGULUM ELAPSOIDES* (HOLBROOK)

Data on the eggs and young of the scarlet kingsnake, *Lampropeltis triangulum elapsoides* (Holbrook), have been provided by Allen (1932), Duellman and Schwartz (1957), Wright and Wright (1957), Palmer (1961), Groves and Sachs (1973), Mount (1975), and Groves and Assetto (1976). This information, however, is restricted to either eggs found in nature or eggs and young from wild-caught gravid females. Dates of copulation,egg-laying, and hatching in captivity were presented by Williams (1978), but no measurements were provided for eggs and young.

A female *L. t. elapsoides* (572 mm total length) collected 25 March 1971, 2.2 km SW Tillman, Jasper Co., South Carolina and a male (483 mm total length) were housed in separate 38 liter (10 gal.) aquaria with paper towel substrates and pine bark for hiding. Fresh water was provided daily and each snake was fed two ground skinks, *Leiolopisma laterale*, or green anoles, *Anolis carolinensis*, weekly. Ambient cage temperature varied between 21-28° C. Windows with a southern exposure provided a natural photoperiod. The male was placed with the female on 15 April 1971.

Copulation was already in progress when observed on 27 April 1971 at 0115. Intromission and coitus were similar to that observed by Gillingham, *et al.* (1977) and Murphy, *et al.* (1978). The male was observed pressing the female down middorsally with four body loops. The female's venter rested upon the substratum with her tail slightly raised. The male's tail was in a ventrolateral position and under the female's tail without encircling it. The male rubbed his chin lightly along the female's neck for 3.5 minutes; tongue flicks occurred at 4-6 second intervals for 2 minutes. After *ca.* 30 minutes, the male relaxed, moved slightly forward, and retracted his hemipenis. The snakes slowly crawled away from each other with their tails raised to a 40-45° angle from the no substratum. The tails were lowered slowly, after 2 minutes, as they crawled about the cage.

The female's appetite thereafter decreased and her girth increased rapidly; bulges appeared along the posterior one-third of her body by 14 May 1971. The pair was separated on 19 May 1971.

On 6 June 1971 at 1125, four eggs were found under a piece of pine bark in the cage. The eggs were soft and adherent. Length and diameter were measured with a vernier caliper; weights were taken. The range in variation was: length, 19.0-31.7 mm (mean 23.7) and diameter, 9.3-12.1 mm (mean 10.4).

The eggs were incubated between layers of dampened paper towels in a .943 liter (1 qt.) plastic freezer container sealed with clear plastic wrap and maintained at 25-31° C. The eggs were checked at weekly intervals for desiccation and fungal infection.

At 1540 on 11 August 1971 the heads of the neonates protruded from longitudinal dorsal slits in two eggs. The remaining two eggs began to hatch at 1610 the same day. All four snakes had completely freed themselves from the shells by 0825 on 12 August 1971. The hatchlings behaved defensively and struck at objects moved near them. Juvenile coloration differed from the adults; the light body rings were white instead of yellow. The lengths were measured by gently stretching each hatchling along a metric rule. The range in length was: 139.7-177.8 mm total length (mean 152.4). No weights were recorded.

After ecdysis on 20 August 1971, the hatchlings were offered the amputated tails of ground skinks, which were eagerly accepted. Each juvenile ate two adult ground skinks weekly until the snakes were released 24 October 1971.

ACKNOWLEDGEMENTS

I thank Bern W. Tryon for his assistance in the field and for his encouragement. I wish to thank R. Howard Hunt for critically reviewing this paper.

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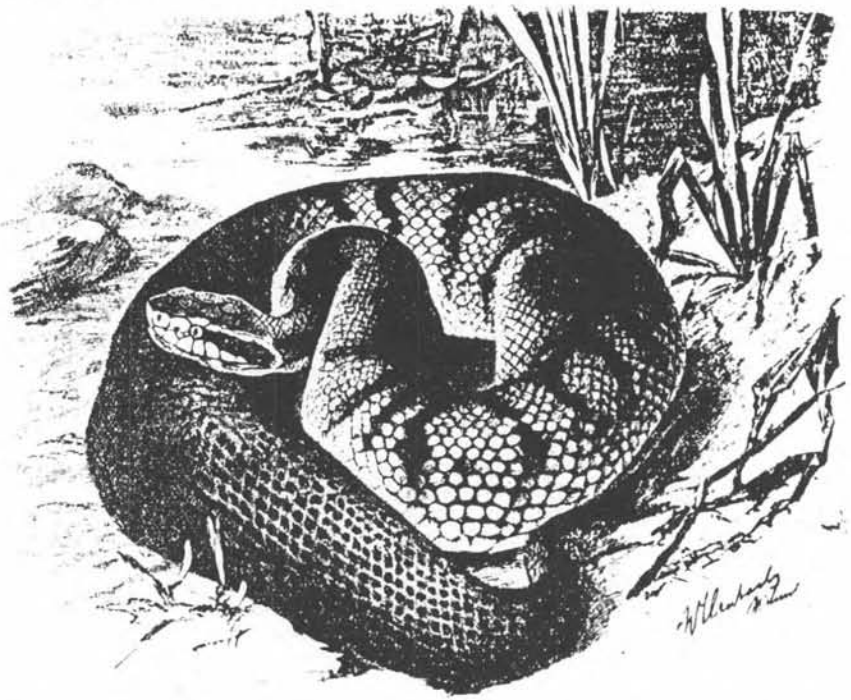
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Smithsonian Institution Press has recently published two books that are of considerable interest to herpetologists. The COMPOSITION OF SCIENTIFIC WORDS (882 pages, 6 x 9", cloth, $12.50) is a reprint of Roland W. Brown's 1956 classic dictionary. The first part of the book offers a brief discussion on the elementary structure of English, Greek, and Latin with a guide to the formulation of technical terms and scientific names. The majority of the volume is an alphabetical list of key words giving their synonyms and cognates in English, Greek, and Latin with occasional additions from thirty-eight other languages or dialects. THE ENGLISH-RUSSIAN: RUSSIAN-ENGLISH DICTIONARY OF VERTEBRATE ZOOLOGY by George J. Jacobs (48 pages, 9 x 10" paper, $4.25) provides a list of terms of special interest to vertebrate systematists and anatomists with a strong emphasis on amphibians and reptiles. Of particular interest will be the "root" words for anatomical terms and the matching Russian common names for herps with their Latin taxonomic equivalents and vice versa. Both books are available for purchase from the Smithsonian Institution Press, P.O. Box 1579, Washington, D. C. 20013.

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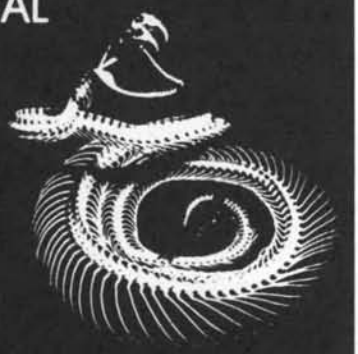
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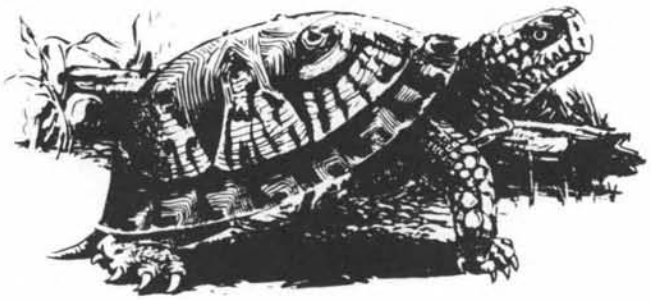
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Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The *standard format* for a geographic distribution record is:

Scientific name (common name) as it appears in *Standard Common and Current Scientific Names for North American Amphibians and Reptiles* (Collins, Huheey, Knight and Smith, 1978). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalog number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the **standard format** only to Joseph T. Collins, Museum of Natural History, Univ. of Kansas, Lawrence, KS 66045. Short manuscripts are only acceptable when data **cannot** be adequately presented in the standard format.

Recommended citation for new distribution records appearing in *Herpetological Review* is: Jones, J. 1977. Geographic distribution: *Rana pipiens*. SSAR Herp. Review 8(1): 1.

ANURA

BUFO DEBILIS INSIDIOR (Western Green Toad). USA: KANSAS: Wallace Co: 6.4 km S Wallace, Sec. 7, T14S, R38W. 10 June 1979. S. Roth. Verified by H. S. Fitch, Univ. Kansas, Lawrence (KU 182086). First record for the county, fourth known locality in Kansas, and the first specimen taken in Kansas since 1928 (Taylor, 1929. Univ. Kansas Sci. Bull., 19:63-65). The female specimen was collected while active by day on the south-facing slope of a dry east-west ravine below a bluff on rocky, sandy soil. Plant associates were *Yucca* and *Gaillardia*. Herpetofaunal associates were *Holbrookia maculata* and *Cnemidophorus sexlineatus*.

Submitted by STANLEY D. ROTH, Biology Department, Lawrence High School, Lawrence, Kansas 66044, and JOSEPH T. COLLINS, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

HYLA ARENICOLOR (Canyon Treefrog). USA: NEW MEXICO: Luna Co: Big Florida Mountains, T 25S, R7W, S31, 0.9 km W and 0.1 km S Byers Spring. 11 July 1978. S.C. Belfit. Verified by A. Price. New Mexico State University Collection (NMSU 5495). This recently metamorphosed adult was collected from a spring box at 1682m. Mountain riparian habitat extends into a steep sided box canyon below the spring. There are several other permanent water sources in the Big Florida Mountains in which this species is likely to occur. Another specimen was collected at Cook's Peak, east side, 27 Sept. 1970. D.L. Hunt. Verified by A. Price. New Mexico State University Collection (NMSU 3823). These records represent the only localities available for the species in Luna County. A distribution survey for seven southwestern New Mexico counties which utilized most of the major herpetological collections in the United States (available from the Las Cruces District office of the Bureau of Land Management, Las Cruces, N.M.) lists no other records of *Hyla arenicolor* from Luna County.

Submitted by SCOTT C. BELFIT, Sci. Dept., Webb School, Bell Buckle, Tennessee, 37020. ●

TESTUDINES

STERNOTHERUS ODORATUS (Stinkpot). USA: NEW YORK: Jefferson Co: SE shore of Ironsides Island, Township of Alexandria. 28 May 1979. P.J. Petokas and M. Rooks. Collection of P.J. Petokas (PJP 120 shell only). NEW YORK: St. Lawrence County: Sheepshead Bay, Township of Hammond. 5 September 1977. P.J. Petokas and S. Archer. One individual captured, marked and released. NEW YORK: Jefferson Co: Point Marguarite Marsh, Township of Alexandria. 20 August 1977. P.J. Petokas, D. Phillips and T. Black. Three individuals captured, marked and released. NEW YORK: Jefferson County: Cranberry Creek-Goose Bay Marsh, Township of Alexandria. 30 June 1977. P.J. Petokas, D. Phillips and T. Black. One individual captured, marked and released. Specimens verified by M. M. Alexander. This report provides the first documented record of this species in northern New York. Logier and Toner (1961, Check List of the Amphibians and Reptiles of Canada and Alaska, Royal Ontario Mus. Contr. No. 53) show range east to the St. Lawrence River in the Province of Ontario, Canada.

Submitted by PETER J. PETOKAS, U.S. Fish and Wildlife Service, 100 Grange Place, Cortland, New York 13045 and MAURICE M. ALEXANDER, Department of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry, Syracuse, New York 13210. ●

SAURIA

ANNIELLA PULCHRA (California Legless Lizard). USA: CALIFORNIA: San Bernardino Co: Big Morongo Wildlife Reserve, Morongo Valley. 14 April 1975. D. Wilson. Identified by J. W. Cornett. Specimen given to Ranger Wilson for release. Most northeastern record of this species. Extends previous known range 11 km northeast (Stebbins, R. 1966. *A Field Guide to Western Reptiles and Amphibians*, Houghton Mifflin Co., Boston). At least two additional observations have been made since the above discovery.

Submitted by JAMES W. CORNETT, Natural Science Department, Palm Springs Desert Museum, Palm Springs, California 92263. ●

GERRHONOTUS LIOCEPHALIS INFERNALIS (Texas alligator lizard). USA: TEXAS: Fayette Co: Monument Hill and Kreische Brewery State Historic Sites, 3 km south LaGrange. 1 September 1978. I.L. Jones and K. Von Minder. Identified by R. W. Neck and D. H. Riskind. Texas Memorial Museum Z1978-2345. Frisch Auf Golf Course, 3 km SW LaGrange. 6 November 1978. L. Evans. Identified by K. Peterson. Karl Peterson private collection (to be deposited at Univ. Texas at Arlington). Heretofore considered to be endemic to the Texas Hill Country and adjacent physiographically similar areas in western Texas and northern Mexico (Raun & Gehlbach, 1972. Dallas Mus. Nat. Hist., Bull. 2:I-61), a viable population has been located 100 km SE of previous nearest specimens from Austin, Travis County. Habitat is wooded, dissected massif of calcareous Oakville Escarpment which supports flora and fauna characterized by outlying populations of species with Hill Country affinities.

Submitted by RAYMOND W. NECK and DAVID H. RISKIND, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744; KARL PETERSON, Department of Herpetology, Houston Zoological Gardens, Houston, Texas 77001. ●

SCELOPORUS UNDULATUS HYACINTHINUS (Northern Fence Lizard). USA: MISSOURI: Pike Co: 3.9 km W Jct. Mo. Rts. 79 & TT on TT (91°13'45"W; 39°33'39"N), 152m. Taken on limestone rocks next to road. 8 April 1978. N. Haskell Jr. Verified by R. W. Axtell, S. Illinois Univ., Edwardsville, (SIUE 2623). Extends range 48.9 km ENE of previous record, Mark Twain State Park, Monroe County (Anderson, 1965, The Reptiles of Missouri, Univ. Mo. Press, Columbia, 330 pp.).

Submitted by NORMAL HASKELL, Jr., 1110 Douglas, Alton, Illinois 62002. ●

SERPENTES

AGKISTRODON PISCIVORUS LEUCOSTOMA (Western Cottonmouth). USA: MISSOURI: Crawford Co: 15.7 km SW Cuba. 16 August 1977. W.J. Drda and D.A. Kluepfel. Private collection of W.J. Drda. First record for Crawford County and first specimens from the Meramec River. Extends range 77.4 km ESE of the record in Miller County (Iberia) and 60.9 km NNE of the record in Dent County (Ashley Creek) (Anderson, 1965, *Reptiles of Missouri*, Univ. Missouri Press, Columbia, 330 pp.).

Submitted by WAYNE J. DRDA, Fox Senior High School, Arnold, Missouri 63010 and DANIEL A. KLUEPFEL, University of Missouri at St. Louis, St. Louis, Missouri 63121. ●

CEMOPHORA COCCINEA COPEI (Northern scarlet snake). USA: OKLAHOMA: Cleveland Co: 14 km SE Norman. 3 August 1978. R.L. Ball, Oklahoma Baptist Univ. Webster Nat. Hist. Mus. (WNHM 238). Extends Oklahoma range 88 km W and 81 km S of the two nearest previous records from Meridian, Logan County, and near the Seminole-Hughes County line (Webb, 1970, Reptiles of Oklahoma, Univ. of Oklahoma Press, 370 pp.).

Submitted by ROBERT L. BALL, 616 W. Walnut St., Tecumseh, Oklahoma 74873. ●

CROTALUS RUBER (Red Diamond Rattlesnake). USA: CALIFORNIA: Riverside Co: Desert Hot Springs. 20 March 1976. J. W. Cornett and J. Bredesky. Identified by J. W. Cornett. Specimen released. Most northeastern record of this species. Extends previous known range 6 km east into creosote scrub community (Klauber. 1972. *Rattlesnakes*, Univ. California Press, Berkeley, 1533 pp.).

Submitted by JAMES W. CORNETT, Natural Science Department, Palm Springs Desert Museum, Palm Springs, California 92263. ●

RAMPHOTYPHLOPS BRAMINUS (Asian Blind Snake). MEXICO: Baja California del Sur: San Ignacio. 8 August 1963. J. R. Heinricks. Identified by R. W. Murphy. Brigham Young University (BYU 2244l). First record of the family Typhlopidae in Baja California. Collected at 1200 hrs within city limits as it crossed a dirt road. Previously recorded from the states of Guerrero, Michoacan and Sinaloa, Mexico (Smith, H. M. and R. B. Smith, 1976, Synopsis of the Herpetofauna of Mexico, Vol. 3, John Johnson, N. Bennington, Vermont). This is the second documented record of an introduced herpetofaunal species in Baja California; *Rana catesbeiana* was previously reported (Mullen, D. A., 1976, Herp. Review, 7(3):122). If this species of snake is indeed parthenogenic (McDowell, 1974, J. Herp., 8(1):1-57), it is likely to become established on the peninsula at other sites containing permanent water.

Submitted by ROBERT W. MURPHY, Department of Biology, University of California, 405 Hilgard Ave., Los Angeles, California 90024, and JOHN R. OTTLEY, Department of Herpetology, Monte L. Bean Life Science Museum, 290 MLBM, Brigham Young University, Provo, Utah 84602. ●

THAMNOPHIS CYRTOPSIS OCELLATUS (Eastern Blackneck Garter Snake). USA: TEXAS: Bell Co: *ca.* 20 km NNE Killeen on the Fort Hood Military Reservation; 30 August 1978. B. G. Stewart and G. A. Splawn. Louisiana St. Univ., Mus. Zool. (LSUMZ 36995). First specimen from county and extension of range about 80 km N of Travis County and 100 km ENE of Llano County (Raun and Gehlbach, 1972, Dallas Mus. Nat. Hist., Bull. 2:1-61). Also represents the first record from the Brazos River Drainage Basin. The vegetation on Fort Hood is a northeastern extension of that typical of the Edwards Plateau of central Texas where *T. cyrtopsis* is fairly common. Thus, its occurrence on Fort Hood was to be expected. The species was also observed several times on Fort Hood (Coryell and Bell Counties) by F. E. Potter, Jr. in 1953.

Submitted by BRUCE STEWART, Environmental Division of Espey, Huston, and Associates, Inc., 3010 S. Lamar, Austin, Texas, 78704, and FLOYD E. POTTER, Jr., Texas Parks and Wildlife Department, 4200 Smith School Rd., Austin, Texas, 78744. ●

TEXAS AMPHIBIANS AND REPTILES: SOME NEW DISTRIBUTIONAL RECORDS, PART II

INTRODUCTION

This is the second serial report of new distributional records of Texas amphibians and reptiles, substantiated with specimens in the Texas A & I University Collections (TAIC). These new records are additions to those summarized by Karges (1978) since Raun and Gehlbach (1972). Nomenclature follows Collins, *et al.* (1978) except where noted, and verification of identifications is by the author. Parenthetical numbers refer to the number of individuals, in a series, with a single TAIC catalog number.

I am appreciative of Dr. Allan H. Chaney for allowing me access to the Texas A & I Collections, and for his suggestions. I also thank Richard R. Schmidt, for his contributions in the field.

SALIENTIA

BUFO DEBILIS (Green Toad): KLEBERG Co. Thirteen specimens from several localities collected over several years. TAIC-299, 346, 780, 830, 871(6) 957, 1452, 1468.

HYLA CINEREA (Green Treefrog): GOLIAD Co. San Antonio River crossing off of U.S. 183, ca. 3 km S Goliad. 10 February 1969. J.

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and S. Davis. TAIC-1757(4). KLEBERG Co. 3.2 km S Kingsville. 17 September 1975. R. Schmidt and J. Karges. TAIC-3860(2).

HYLA CRUCIFER (Spring Peeper): SAN JACINTO Co. Double Lakes, Sam Houston National Forest. 16 March 1968. B. Chapman. TAIC-1570.

HYPOPACHUS VARIOLOSUS (Sheep Frog): WILLACY Co. Thirteen specimens were collected during 1972 at several locations. TAIC-2987, 2909, 3212, 3240(10).

PSEUDACRIS CLARKI (Spotted Chorus Frog): NUECES Co. Three groups of specimens were collected at 5.1 km E Driscoll, Flour Bluff, and Corpus Christi, respectively in order of increasing catalog numbers. All were collected in 1972 by different collectors. TAIC-794(9), 1488(2), 2081(2).

RANA CATESBEIANA (Bullfrog): BROWN Co. Weedon's Quarry on FM 2559, but precise locality of the collection site is unknown. 7 October 1968. R. Zimmerman, *et al.* TAIC-1689. LA SALLE Co. 24 km S Cotulla, off FM 468. 8 & 9 April 1967. A Chaney *et at.* TAIC-648(15). MATAGORDA Co. The total of 48 specimens are from numerous localities within the county, and have been collected by Texas A & I University field crews on several annual field trips. TAIC-2452(8), 2607(13), 2994, 3143(2), 3431, 3494, 3611(8), 3778. SAN SABA Co. 1.6 km SW Bend on FM 580. 4 October 1968. R. Zimmerman, *et al.* TAIC-1684. WALLER Co. 9.6 km NW Katy. Spring, 1967. W. Kretz. TAIC-634(2). WEBB Co. 72 km N Laredo. 18 April 1968. A. Chaney, *et al.* TAIC-1156(3). These three specimens are a range-margin extension in southern Texas, and may have been introduced to stock ponds (A. H. Chaney, pers. comm.).

SCAPHIOPUS BOMBIFRONS (Plains Spadefoot): JIM WELLS Co. 19.2 km SW Alice on FM 754. 7 September 1975. R. Schmidt and J. Karges. TAIC-3862(2). WILLACY Co. San Perlita. 3 May 1972. T. Blasienz. TAIC-3243.

SCAPHIOPUS COUCHI (Couch's Spadefoot): MAVERICK Co. 1.3 km E El Indio. 18 May 1978. J. Karges. TAIC-4410. 16.8 km SE Quemado. 18 May 1978. J. Karges. TAIC-4467(2).

SCAPHIOPUS HOLBROOKI HURTERI (Hurter's Spadefoot): BROOKS Co. 4.4 km W Falfurrias on TX 285. 13 March 1967. E. Martin and C. Hatch. TAIC-562. WILLACY Co. Fourteen specimens, in six series, are from various localities within the county, by several collectors. TAIC-2891, 2983(4), 2898, 2905, 2911(6).

TESTUDINES

CHELYDRA SERPENTINA (Snapping Turtle): Mc CULLOCH Co. 16.5 km N Brady on US 377. 21 May 1978. J. Karges. TAIC-4396. Very few specimens have been reported from this central portion of the state.

CHRYSEMYS CONCINNA TEXANA (Texas River Cooter): LLANO Co. Lake Buchanan 6.4 km W Buchanan Dam. 13 June 1976. D. Wood.

CHRYSEMYS SCRIPTA ELEGANS (Red-eared Slider): WILLACY Co. San Perlita. 26 April 1972. P. Carrizales. TAIC-3276.

GOPHERUS BERLANDIERI (Texas Tortoise): WILLACY Co. San Perlita. 5 May 1972. R. Olivarez. TAIC-3279.

KINOSTERNON FLAVESCENS (Yellow Mud Turtle): JIM WELLS Co. 32 km NW Alice. 10 April 1964. A. H. Chaney, *et al.* TAIC-146. MAVERICK Co. 6.5 km W Eagle Pass on US 277. 19 April 1964. A. H. Chaney, *et al.* TAIC-492. WILLACY Co. Two specimens collected in April 1972 by different collectors at San Perlita. TAIC-3280, 3281.

TERRAPENE ORNATA (Western Box Turtle): NUECES Co. 14.4 km N Agua Dulce on FM 70. 26 August 1969. S. Labuda. TAIC-2018.

TRIONYX MUTICUS (Smooth Softshell): LLANO Co. Lake Buchanan, 6.4 km W Buchanan Dam. 9 June 1976. D. Wood. TAIC-4558.

TRIONYX SPINIFERUS (Spiny Softshell): KLEBERG Co. Kingsville. 23 May 1966. A. H. Chaney. TAIC-365. NUECES Co. Celanese Park, 9.6 km N Kingsville. 22 April 1965. S. Weisman. TAIC-510.

SAURIA

CNEMIDOPHORUS SEXLINEATUS (Six-lined Racerunner): GAINES Co. Seminole. 14 July 1967. K. Matocha and R. Zimmerman. TAIC-879(2). These specimens extend the range-margin of this species westward, from Lynn and Midland Cos.

EUMECES LATICEPS (Broadhead Skink): LAMAR Co. 6.8 km E Novice on FM 195. 24 May 1972. R. Enloe. TAIC-3170.

EUMECES TETRAGRAMMUS BREVILINEATUS (Short-lined Skink): MAVERICK Co. 3.2 km E Eagle Pass. 23 April 1971. A. Chaney, *et al.* TAIC-2473(2). I use the name *brevilineatus* as subspecific, pending publication of forthcoming taxonomic review (*fide* J.R. Dixon, pers. comm.).

HOLBROOKIA LACERATA (Spot-tailed Earless Lizard) :EDWARDS Co. 13.6 km W Rocksprings. 30 May 1973. H. Smith. TAIC-3517.

HOLBROOKIA MACULATA (Lesser Earless Lizard): GAINES Co. Seminole. 14 July 1967. K. Matocha and R. Zimmerman. TAIC-773(6).

HOLBROOKIA PROPINQUA (Keeled Earless Lizard): MAVERICK Co. 3.2 km NW Eagle Pass. 23 April 1971. A Chaney, *et al.* TAIC-2469(18). These specimens were taken farther up the Rio Grande watershed than previously reported, and represent a range extension north and westward.

PHRYNOSOMA CORNUTUM (Texas Horned Lizard): LAMPASAS Co. 6.4 km NE Lomita. 5 October 1968. R. Zimmerman, *et al.* TAIC-1681.

UROSAURUS ORNATUS ORNATUS (Eastern Tree Lizard): MAVERICK Co. 43.2 km NW Eagle Pass on US 277. Neither date nor collector recorded. TAIC-106. 3.2 km E Eagle Pass. 23 April 1973. A. Chaney, *et al.* TAIC-2477(8).

SERPENTES

LEPTOTYPHLOPS DULCIS (Texas Blind Snake): LEE Co. 6.4 km S Giddings on US 77. 22 May 1976. J. Karges. TAIC-3943. REAL Co. 11.2 km E Vance. 2 April 1964. B. Jennings. TAIC-1932.

ARIZONA ELEGANS (Glossy Snake): COMANCHE Co. 7.3 km NE Comanche on US 377-4399. This specimen is from the central Texas hiatus mapped by Dixon and Fleet (1976).

COLUBER CONSTRICTOR FLAVIVENTRIS (Eastern Yellowbelly Racer): KERR Co. 20.8 km S Ker23 November 1973. A. Chaney. TAIC-3542. McCULLOCH Co. 19.6 km N Brady on US 377. 28 May 1978. J. Karges. TAIC-4414.

ELAPHE GUTTATA EMORYI (Great Plains Rat Snake): COMANCHE Co. 28.8 km NE Comanche on US 377. 28 May 1978. J. Karges.TAIC-4419.

ELAPHE OBSOLETA LINDHEIMERI (Texas Rat Snake): BEE Co. 1.6 km W Beeville on US 59. 12 May 1968. B. Simersky. TAIC-1489. LIVE OAK Co. 3.2 km N Dinero at Buckeye Knoll. 20 April 1968. B. Simersky. TAIC-1277. WHARTON Co. N Wharton. 3 July 1969. M. Simons. TAIC-236.

HYPSIGLENA TORQUATA JANI (Texas Night Snake): KLEBERG Co. 7 km W Riviera on TX 285. 23 April 1970. K. Cardwell. TAIC-2193. LA SALLE Co. 24 km SW Cotulla on FM 468. 8 April 1967. A. Chaney, *et al.* TAIC-654.

LAMPROPELTIS GETULUS SPLENDIDA (Desert Kingsnake): GOLIAD Co. 6.4 km S Goliad. 22 May 1976. J. Karges. TAIC-3939. KERR Co. 20.8 km S Kerrville. 30 March 1968. A. Chaney, *et al.* TAIC-1057. LUBBOCK Co. Lubbock. 17 May 1970. V. McDaniel and K. Matocha. TAIC-2558.

MASTICOPHIS FLAGELLUM (Coachwhip): BRISCOE Co. 16 km WSW Quitique. 4 September 1968. K. Matocha and B. Chapman. TAIC-1649. GUADALUPE Co. 23.5 km N Stockdale on TX 123. 6 August 1978. S. Parker and J. Karges. TAIC-4616. LAMAR Co. 6.8 km E Novice on FM 195. 24 May 1972. R. Enloe. TAIC-3175. MAVERICK Co. Seven specimens have been collected from different localities by several collectors. TAIC-1797, 1853(2), 2065, 3552, 3562, 3685.

NERODIA RHOMBIFERA (Diamondback Water Snake): BROOKS Co. 25.6 km W Riviera on TX 285. 23 July 1976. J. Karges and R. Schmidt. TAIC-4000. SAN JACINTO Co. 4.8 km E Pumpkin on TX 150. 22 March 1975. A. Chaney and J. Rickner. TAIC-3751. STARR Co. 4 km W Rio Grande City on US 83. 1 August 1978. J. Karges, *et al.* TAIC-4609.

OPHEODRYS AESTIVUS (Rough Green Snake): KLEBERG Co. Kingsville. 28 March 1966. B. Chapman and C. Trilica. TAIC-273. This specimen is a range-margin extension southward towards recorded localities in Cameron and Hidalgo Cos.

PITUOPHIS MELANOLEUCUS SAYI (Bullsnake): MAVERICK Co. 16 km N Eagle Pass. 27 April 1978. J. Cano, *et al.* TAIC-4356.

SALVADORA GRAHAMIAE LINEATA (Texas Patchnose Snake): DIMMITT Co. 12.5 km E Catarina. 9 April 1965. A. Chaney, *et al.* TAIC-188. DUVAL Co. 16 km S San Diego. 29 April 1978. S. Schmidt, *et al.* TAIC-4615. MAVERICK Co. 4 km N Eagle Pass on US 83. 17 April 1966. TAIC-331. 2.4 km N Quemado. 13 April 1974. A. Chaney, *et al.* TAIC-3655.

SONORA EPISCOPA (Ground Snake): JIM WELLS Co. 7.3 km W Palito Blanco on FM 735. 10 April 1964. A. Chaney, *et al.* TAIC-441. 27.2 km SSW Alice on FM 2295. 5 June 1978. R. Schmidt and J. Karges. TAIC-4362. KLEBERG Co. Sixteen specimens represent much of the county, and were collected by several collectors. TAIC-227, 443, 448, 453, 469, 501(2), 509, 630, 658, 752, 802, 989, 995, 1542, 2309.

TANTILLA ATRICEPS (Mexican Blackhead Snake): KERR Co. 20.8 km S Kerrville. 11-13 October 1968. A. Chaney, *et al.* TAIC-1657(6). WEBB Co. N Aguilares on FM 2050. 8 February 1969. J. Rickner, *et al.* TAIC-1773.

TANTILLA GRACILIS (Flathead Snake): Mc MULLEN Co. 28.8 km N Freer on FM 624. 29 March 1968. A. Chaney, *et al.* TAIC-1021(3). WEBB Co. N Aguilares on FM 2050. 8 February 1969. J. Rickner, *et al.* TAIC-1768. 19.2 km W Encinal at jct. US 83 and TX 44. 23 April 1970. A Chaney, *et al.* TAIC-2125.

TANTILLA NIGRICEPS (Plains Blackhead Snake): BROOKS Co. 6 km N Encino on US 281. 23 January 1972. D. McCarty and R. Leal. TAIC-2721. KLEBERG Co. The total of 25 specimens are from various localities within the county. TAIC-249, 458, 500(15), 593, 914(3), 931, 998, 1063, 1957. MAVERICK Co. E Eagle Pass on US 277. 17 April 1966. A. Chaney, *et al.* TAIC-334.

THAMNOPHIS MARCIANUS (Checkered Garter Snake): WILLACY Co. 6 km N Raymondville on US 77. 25 April 1972. TAIU Herpetology Class. TAIC-3089. Raymondville. 9 February 1974. T. Ortiz. TAIC-3573.

VIRGINIA STRIATULA (Rough Earth Snake): GOLIAD Co. ca. 3 km S Goliad. 10 February 1969. J. Davis, *et al.* TAIC-1755(2). Goliad. 5 March 1974. JR. Ortiz. TAIC-3581. KIMBLE Co. East Fork James River crossing of FM 385. 16 April 1972. A. Chaney, *et al.* TAIC-3190. This record is a range-margin extension southwestward from adjacent counties. NUECES Co. 6.4 km NW Corpus Christi. 15 March 1969. K. Cardwell. TAIC-1811. Corpus Christi. 11 March 1972. R. Barrera. TAIC-2927. Both of the Nueces County specimens represent range-margin extensions from adjacent San Patricio County.

MICRURUS FULVIUS TENERE (Texas Coral Snake): DIMMITT Co. 24.7 km S Catarina on US 277. 18 April 1968. A. Chaney, *et al.* TAIC-1166. Carizzo Springs. 28 April 1978. A. Chaney, *et al.* TAIC-4444.

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Raun, G.G. and F. R. Gehlbach. 1972. Amphibians and reptiles in Texas. Dallas Museum of Natural History, Bulletin 2:1-61.

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DISTRIBUTION OF THE CHILEAN LIZARD *PRISTIDACTYLUS TORQUATUS*

The distributional range of *Pristidactylus torquatus* (Philippi, 1861) is in need of revision. Donoso-Barros (1966) published a distributional map of this lizard; however, it is a general approach and localities are not precisely noted. Donoso-Barros (1970) indicated that this species ranges from Curicó (Central Chile) to the Valdivian lakes (Southern Chile).

On the basis of 22 males, 23 females and 11 juveniles from the Zoological Museum of the Concepción University (MUZUC), 2 males and a juvenile deposited in the Herpetological Collection of the Zoology Institute of the Austral University, Valdivia (IZUA), and 16 males and 7 females from the Catholic University, Sede Talca (ICTH), a new distributional map of *P. torquatus* was contructed (Fig. 1) which was overlapped on Donoso-Barros's map. Of the localities recorded, four are new and enlarge the distributional range of *P. torquatus* to the north. Locality 1: Coihueco (Ñuble Province), 21 km (air line) SE of Chillán city (juvenile, MUZUC 5617) collected by Marquez on 21 February 1966. Locality 2: San Carlos (Ñuble Province), 22 km (by road) N of Chillán city, (juvenile, MUZUC 5604) collected by O. Felis on 25 January 1968. Locality 3: Alto Vilches (Talca Province), 1200 m, 68 km (by road) E of Talca city

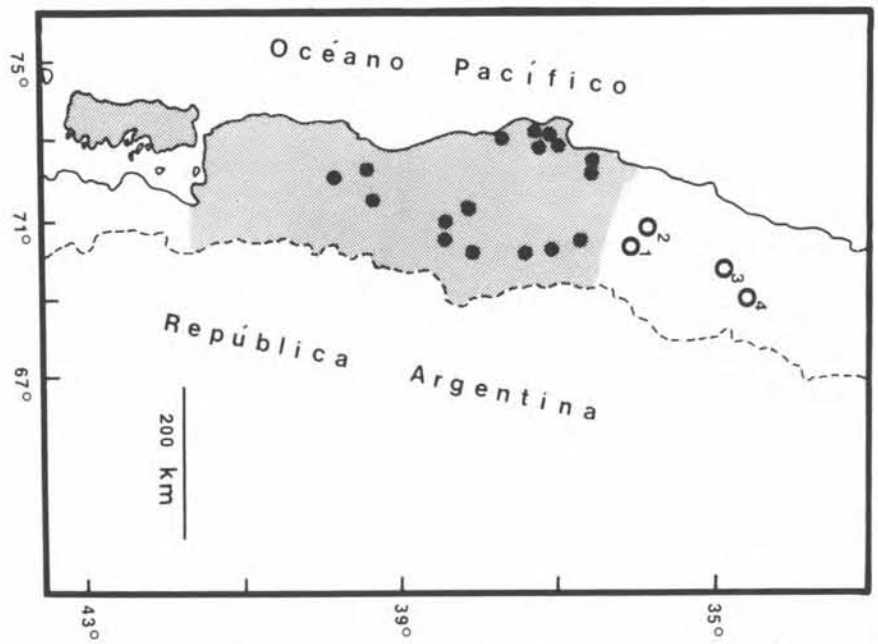


Fig. 1. *Pristidactylus torquatus* (Philippi, 1861). Open circles indicate new distributional records (numbers see text), closed circles indicate localities from which specimens were examined and Donoso-Barros's map is shaded.

(16 males; UCTH 0002-0009, 0012-0018, 0020 and 6 females; UCTH 0001, 0006, 0010, 0011, 0015, 0019) collected by R. Montecinos on November 1975 and March 1976. Locality 4: Los Queñes (Curicó Province), 42 km (air line) E of Curicó city (1 female; UCTH 0021) collected by R. Montecinos on 28 December 1976. This locality is the Northernmost locality from which *Pristidactylus torquatus* is known.

The lizards from Alto Vilches (Talca Province) were collected at a *Nothofagus* forest (*N. dombeyi, N. leoni, N glauca*). Here, the following reptiles were observed with *Pristidactylus torquatus*: *Tachymenis peruviana, Alsophis chamissonis, Liolaemus lemniscatus, L. pictus, L. tenuis,* and *L. chilensis.*

ACKNOWLEDGMENTS

We wish to thank Mr. Tomás Cekalovich, Curator of the Zoological Museum of the University of Concepción, who allowed us access to the specimens deposited in that collection.

LITERATURE CITED

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NEWS NOTES

1980 SSAR GRANTS-IN-HERPETOLOGY DEADLINE

The Society for the Study of Amphibians and Reptiles announces the continuation of its Grants-in-Herpetology program. Four grants of at least $275. Each will be available for awarding at the SSAR annual meeting in 1980 in Milwaukee, Wisconsin. Proposals will be considered in the following areas: 1) herpetology-oriented conservation, 2) graduate student research, 3) regional society programs or projects, and 4) research in zoos.

Proposals should be typewritten (no more than five double-spaced pages) and include a statement of the problem, objectives, methods, and budget. Each applicant should have a letter of support sent by a graduate advisor, institutional or organizational officer, or another person qualified to assess their proposal. Proposals will be evaluated on the basis of appropriateness to the program, chances of success, and qualifications of the applicant by a committee comprised of Linda R. Maxson, John D. Groves, Martin J. Rosenberg, Terry Graham, and Harry W. Greene. Proposals and supporting letters should be submitted in duplicate no later than 1 April 1980 to HARRY W. GREENE, Museum of Vertebrate Zoology, University of California, Berkeley, California 94720.

FACSIMILE REPRINTS IN HERPETOLOGY

The Society for the Study of Amphibians and Reptiles wishes to thank the following persons for their past service as members of the Editorial Committee for Facsimile Reprints:

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The Committee welcomes suggestions of important papers and books that should be considered for reprinting. Details of such titles should be sent to the Editor.

Kraig Adler, Editor
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SSAR KENNEDY AWARD

The SSAR provides for a cash award of $100 to be presented to the author of the best student paper published in each volume of the *Journal of Herpetology*. Eligible papers must be authored (or co-authored) solely by students and must be deemed worthy of the award by the Kennedy Award Committee.

Students are encouraged to be aware of the Award and to participate in the competition for it. Authors may request consideration by answering a questionnaire upon receipt of page proofs.

NOTICE TO AUTHORS PLANNING TO SUBMIT MANUSCRIPTS TO THE JOURNAL OF HERPETOLOGY

All manuscripts for the *Journal of Herpetology* should be submitted to the new editor of the *Journal:*

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Authors should send three (3) copies of the manuscript and all figures and illustrations should be on sheets 8½ x 11 inches.

RESEARCH REQUEST

Robert A. Young (Physiology Dept., Southern Illinois University, Carbondale, IL 62901) seeks the use of live rear-fanged snakes (especially *Boiga*). Snakes will not be harmed. Donations are preferable to loans as shipping is expensive.

Legislative Alert

LEGISLATIVE ALERT EDITOR'S NOTE:

Since the first appearance of this column in 1977 (H.R. 8(2): 37-38), I have concentrated more or less on reprinting those lists, regulations, and statutory references of U.S. federally regulated reptiles and amphibians. I will continue to provide this information; however, today over 100 treaties, international agreements, federal statutes, executive orders and federal regulations provide a complex array of interrelated and sometimes overlapping, requirements which are difficult, if not impossible, to understand. In an effort to encourage a broader understanding of the evolution and structure of the many federal laws relevant to the herpetological community, I will begin with the next issue (Herp. Rev. 11(1) to provide a brief insight into the historical, current and Constitutional underpinnings of the federal laws, court opinions, treaties and statutes which shape the present system, and some possibilities for its impovement in the future.

At this time I am soliciting *your* comments, views, ideas, etc. concerning these issues. It is my hope that this "new" approach will serve to: 1) awaken the herp community to the federal restrictions which circumscribe its activities; 2) motivate a *united* herp community to accept its responsibility to lobby and influence Congressional legislation affecting herps; and 3) serve notice to agency rulemakers that a *united* herp community demands its growing voice be heard in recognition of its own special interests and in the shaping of the future of the world's wildlife.

FINAL Rulemaking:

a) from *Federal Register*, Vol. 44, No. 174, 6 September 1979, page 51980: the special rule concerning the American alligator (*Alligator mississippiensis*) found in 50 CFR 17.42(a) has been amended to authorize the taking of alligators in the state of Louisiana in those 12 parishes in which the alligators are listed as threatened—similarity of appearance (Cameron, Vermilion, Calcasieu, Iberia, St. Mary, St. Charles, Terrebonne, Lafourche, St. Bernard, Jefferson, St. Tammany, and Plaquemines), provided that the hides of such alligators are only sold or offered for sale to persons holding a valid federal permit to buy hides issued under the special rule and the meat or other parts, except hides, of such alligators are sold only in the state of Louisiana in accordance with the laws and regulations of

that state. This rulemaking became effective 6 September 1979.

b) from *Federal Register*, Vol. 44, No. 181, 17 September 1979, page 54002: . . . the U.S. Fish and Wildlife Service recognizes that captive propagation is, in some cases, important for conserving species, and that the Endangered Species Act (as amended) authorizes the permitting of otherwise prohibited activities to enhance the propagation or survival of affected species. This rule grants general permission for persons to conduct otherwise prohibited activities with captive-bred wildlife under specified conditions, which are designed to protect wild populations of wildlife and to ensure that the activities will be conducted to enhance the propagation or survival of the species. This rulemaking (i.e., captive, self-sustaining populations) became effective on 17 September 1979.

PROPOSED Rulemaking:

a) from *Federal Register*, Vol. 44, No. 143, 24 July 1979, page 40442: the U.S. Fish and Wildlife Service now believes that the American crocodile (*Crocodylus actus*) populations outside of Florida population which was listed as Endangered on 25 Sept. 75, and the saltwater crocodile (*C. porosus*) populations exclusive of the Papua, New Guinea population to be endangered. Deadline for comments is 26 October 1979.

Send to: Director, (O.E.S.)
U.S. Fish and Wildlife Service
Department of Interior
Washington, D.C. 20240

b) from *Federal Register*, Vol. 44, No. 179, 13 September 1979, page 53422: the Fish and Wildlife Service re-proposes critical habitat for the Plymouth red-bellied turtle (*Chrysemys rubriventris bangsi*). Endangered status and critical habitat were originally proposed for this species on 19 May 1978, but the critical habitat portion of this proposal was withdrawn on 6 March 1979 because of procedural and substantive changes in the amended Endangered Species Act. Deadline for comments is 16 November 1979.

Send to: same as above

STATE-PROPOSED Rulemaking: Ohio House Bill 645—this bill will prohibit "any person owning or buying nonnative poisonous reptiles as pets, to prohibit any person from selling such reptiles except to a zoo, and to permit zoos to buy such reptiles for exhibition."

Comments to: Chairman Jerome Stana
State Agriculture, Conservation, and Environment Committee
Ohio Senate
State House
Columbus, Ohio 43215

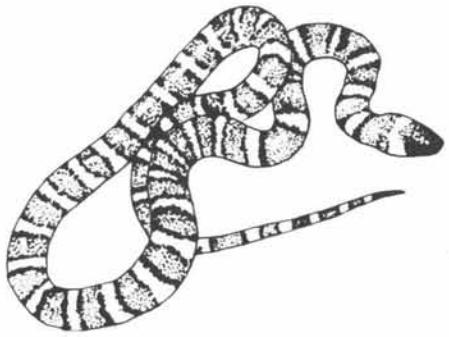
NEW DUTCH HERP GROUP

The Nederlandse Studiegroep voor Anolissen, formed about two years ago, is a subdivision of the Nederlandse Vereniging voor Herpetologie en Terrarium-kunde. Their bulletin is devoted entirely to *Anolis* articles, and is published every two months. Major articles have English summaries. The group especially welcomes articles on *Anolis* reproduction, ethology and ecology. For more information, write:

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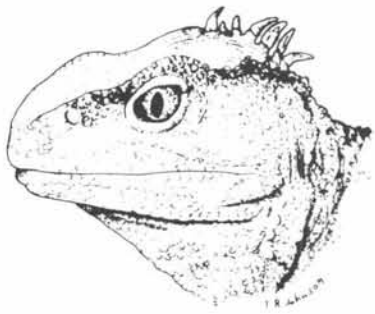
Hawaiian green turtle (*Chelonia mydas*) and monk seals (*Monachus schauinslandi*) basking on a small islet at French Frigate Shoals (23°45'N, 166°10'W). Land basking by sea turtles has only been documented for *Chelonia*, with members of the Hawaiian population possibly being the only ones at the present time exhibiting this rare behavioral trait. Hawaiian green turtles and monk seals frequently share the same beaches and inshore waters, however it is relatively uncommon for direct physical contact to take place with one another. (Photograph by George H. Balazs, Hawaii Institute of Marine Biology, P. O. Box 1346, Kaneohe, Hawaii 96744).



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The following statement-of-purpose appeared in the Introduction to the first issue of **Herpetological Review** in 1967 (Corson Hirschfeld, Editor):

> "**Herpetological Review** incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the **Review** will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to all persons in herpetology and we hope all members will find it informative and entertaining."

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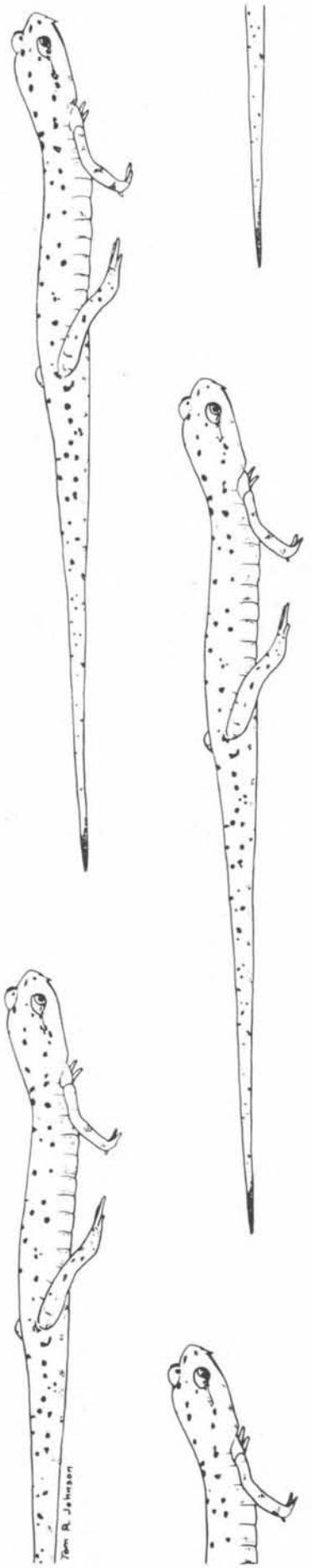
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Contents

SSAR BUSINESS
SSAR "translations project" 82, 83
FEATURE ARTICLES
The number of amphibians and reptiles, by William E. Duellman 83, 84
Two aberrant crotalid snakes from Kansas, by Kelly J. Irwin 85
An early published account of the cactus-corral myth, by J. Howard Campbell 85, 86
Remarks on defensive behavior of hognose snakes, *Heterodon*, by Owen J. Sexton 86, 87
An electromechanical method of monitoring tongue-flickers in snakes, by Rocky Ward and Ernest H. Harrell 87
Literature of the International Zoo Yearbook, Volumes 1-18 (1959-1978), by Bern W. Tryon 87-90
A new trap for basking turtles, by Peter J. Petokos and Maurice M. Alexander 90
Herpetology at the University of Michigan, by Arnold G. Kluge 91, 92
Obituary—Donald W. Pyle, by William S. Brown 92
HERPETOLOGICAL HUSBANDRY
Reptile reproduction at the Fort Worth Zoo (from AAZPA Nwsltr.) 93
Husbandry info requested (from AAZPA Nwsltr.) 93
Deceased alligator snappers needed (from AAZPA Nwsltr.) 93
Combat behavior in the dusky pygmy rattlesnake, *Sistrurus miliarius barbouri*, in captivity, by Peter Lindsey 93
Notes on captive reproduction in *Echis colorata* (Serpentes: Viperidae), by Mike Goode 94
BOOK REVIEWS
The Sand Lizard, *Lacerta agilis*, edited by A. Jablokov Reviewed by George Mamonov 96, 97
Identification manual to the amphibians and reptiles of Florida, by Ray E. Ashton, Jr., Reviewed by George R. Pisani 97
Introduction to herpetology, 3rd edition, by Coleman J. Goin, Olive B. Goin, and George R. Zug, Reviewed by George Pisani 97
The biology of an equatorial herpetofauna in Amazonian Ecuador, by William E. Duellman, Reviewed by John D. Lynch 97, 98
Dietary adaptations in animals, by J. L. Cloudsley - Thompson, Reviewed by George R. Pisani 98
Early herpetological studies and surveys in the eastern United States edited by Kraig Adler, Reviewed by Joseph T. Collins 99
LEGISLATION
Legislative alert, compiled by Thomas J. Berger 99
Lizards, laws and litigation, by William E. Duellman 99, 100
Houston Toad Recovery Team meets in Houston, by Lauren E. Brown 100
Interim report on the compilation of a standard list of common names for a field guide to Mexican amphibians and reptiles: naming criteria, by Patricia K. Blaney, Richard M. Blaney, Larry David Wilson 100, 101
GEOGRAPHIC DISTRIBUTION
New records 101-103
Range extension of the snake, *Sibon anthracops* (Cope), in El Salvador, by Hugo Hidalgo 103
Observations on *Chelonia mydas mydas:* a northerly extension of known nesting range, by D. L. Stoneburner *et al.* 103, 104
NEWS NOTES 104

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If you have an article for translation that you feel would appeal to a large segment of the herpetological community, send a copy or reprint to the editor and we will try to have it translated.

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THE NUMBERS OF AMPHIBIANS AND REPTILES

Questions frequently asked of museum or zoo curators deal with the numbers of kinds of frogs, turtles, or snakes. Usually the answers to such questions are guesses. In the course of preparing an encyclopaedic account of the living amphibians and reptiles, I tallied the numbers of recognized families and the numbers of genera and species in each.

For some large families such as Hylidae, Centrolenidae, Amphisbaenidae, Gekkonidae, Pygopodidae, Agamidae, and Chamaeleontidae, plus the turtles and crocodilians, recent checklists or reviews are available (Wermuth, 1965, 1967; Mertens, 1966; Gans, 1967; Kluge, 1976; Duellman, 1977; Wermuth and Mertens, 1977). For some groups in certain regions, recent regional catalogues were major sources of data (*e.g.*, Peters and Donoso-Barros, 1970; Peters and Orejas-Miranda, 1970; Cogger, 1975). Richard Etheridge kindly provided numbers of iguanid lizards. For many groups, data were obtained from innumerable revisions and faunal lists; many of these are out-of-date, and some present conflicting data. Therefore, some of the resulting tabulations may be highly accurate, whereas others, because of inadequate taxonomic treatment of a group or my subjectivity in selecting one arrangement over another, are open to question.

Even at the family level the classification of amphibians and reptiles is unstable (see especially Savage, 1973, versus Duellman, 1975, for families of frogs; Underwood, 1967, versus Smith, Smith and Sawin, 1977, for families of snakes). Some of these discrepancies are due to inadequate knowledge and understanding of the characters of the animals, such as the problems in snake classification. In other cases, the application of new methodologies, such as cladistics (*e.g.*, Gaffney, 1975), results in taxonomic rearrangements.

The continued rapid discovery of new species especially in tropical genera, such as *Bolitoglossa*, *Eleutherodactylus*, *Centrolenella*, and *Anolis*, seemingly makes a tabulation of the number of taxa an exercise in futility. With all of these considerations in mind, I offer the tabulations (Tables 1-2) with neither apologies nor confidence limits.

Comparisons of the North American (United States and Canada) herpetofauna based on numbers of taxa provided by Collins et al. (1978) reveals that North America has relatively diverse salamander, turtle, and snake faunas but rather poor anuran and lizard faunas (Table 3). Of the 36 families of amphibians and 46 families of reptiles in the world, 14 of amphibians and 21 of reptiles occur in North America. Similar numbers (15 and 22, respectively) inhabit South America. Personal compilations of the South American herpetofauna reveal that in comparison with North America, South America has much higher percentages of the known species of frogs and lizards, slightly more snakes, and fewer salamanders and turtles (Table 3).

I have not attempted a complete geographical analysis of the number of taxa. In addition to the data given for North and South America, a compilation of data given by Cogger (1975) reveals the presence of 155 species of amphibians and 529 species of reptiles in Australia—a total of 684 species, or 7.4 percent of the herpetofauna of the world. Australia is especially rich in lizards, with 364 species (11%) and also has a relatively large frog fauna (155 species, 6%). By comparison, North America has about 5 percent of the species of amphibians and reptiles, whereas about 24 percent occur in South America.

My figures are slightly lower than those in a list of the vertebrates of the world, dated October 1978, compiled by the National Fish and Wildlife Laboratory, Gainesville, Florida. That list has totals of 3,373 amphibians and 6,508 reptiles. Although that list apparently does contain a few recently described species not included in my tabulations, it also includes many synonyms, which seem to account for the major part of the numerical discrepancy.

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Table 1. - Numbers of living families, genera and species in the major groups of amphibians and reptiles.

GROUP	FAMILIES	GENERA	SPECIES
Salamanders	8	52	336
Anurans	23	295	2770
Caecilians	5	33	154
Turtles	11	72	222
Tuatara	1	1	1
Lizards	17	363	3307
Snakes	14	418	2267
Amphisbaenians	2	23	135
Crocodilians	1	8	22
Total Amphibians	36	380	3260
Total Reptiles	46	885	5954
Grand Total	82	1265	9214

Table 2. - Numbers of genera and species in the living families of amphibians and reptiles.

FAMILY	GENERA	SPECIES
CAUDATA		
Hynobiidae	4	31
Cryptobranchidae	2	3
Sirenidae	2	3
Salamandridae	14	43
Proteidae	2	6
Amphiumidae	1	3
Ambystomatidae	4	33
Plethodontidae	23	214
ANURA		
Leiopelmatidae	2	4
Discoglossidae	4	10
Rhinophrynidae	1	1
Pipidae	4	17
Pelobatidae	8	49
Pelodytidae	1	2
Myobatrachidae	25	95
Pelodryadidae	2	119
Sooglossidae	2	3
Heleophrynidae	1	3
Leptodactylidae	46	650
Bufonidae	20	279
Brachycephalidae	2	2
Rhinodermatidae	1	2
Dendrobatidae	3	73
Pseudidae	2	4
Phyllomedusidae	3	39
Hylidae	30	395
Centrolenidae	2	59
Microhylidae	63	232
Ranidae	45	586
Hyperoliidae	14	54
Rhacophoridae	14	96
GYMNOPHIONA		
Rhinatrematidae	2	9
Ichthyophiidae	2	35
Typhlonectidae	4	19
Caeciliidae	24	85
Scolecomorphidae	1	6
TESTUDINES		
Pelomedusidae	10	31
Chelidae	3	14
Kinosternidae	4	23
Dermatemydidae	1	1
Trionychidae	7	23
Carettochelyidae	1	1
Dermochelyidae	1	1
Cheloniidae	4	5
Chelydridae	3	4
Emydidae	28	80
Testudinidae	10	39
RHYNCHOCEPHALIA		
Sphenodontidae	1	1
SAURIA		
Gekkonidae	86	733
Pygopodidae	6	29
Iguanidae	55	608
Agamidae	36	320
Chamaeleontidae	2	88
Xantusiidae	4	14
Teiidae	38	198
Lacertidae	27	210
Cordylidae	10	54
Scincidae	85	1029
Dibamidae	2	4
Xenosauridae	2	4
Anguidae	6	74
Anniellidae	1	2
Helodermatidae	1	2
Varanidae	1	30
Lanthanotidae	1	1
SERPENTES		
Loxocemidae	1	1
Xenopeltidae	1	1
Aniliidae	1	1
Uropeltidae	10	52
Boidae	18	58
Bolyeridae	2	2
Tropidophiidae	4	20
Anomalepidae	4	20
Typhlopidae	2	147
Leptotyphlopidae	2	64
Acrochordidae	1	2
Colubridae	291	1550
Elapidae	63	169
Viperidae	18	182
AMPHISBAENIA		
Amphisbaenidae	19	129
Trogonophidae	4	6
CROCODILIA		
Crocodylidae	8	22

Table 3. Numbers of genera and species of amphibians and reptiles in North America and South America. (Percentages are of total taxa of group in the world)

	NORTH AMERICA				**SOUTH AMERICA**			
GROUP	Genera		Species		Genera		Species	
	N	%	N	%	N	%	N	%
Salamanders	26	50	111	30	2	4	24	7
Anurans	17	6	81	3	98	33	996	36
Caecilians	-	-	-	-	15	45	75	49
Turtles	18	25	48	21	13	18	36	16
Lizards	26	7	92	3	84	23	471	14
Snakes	47	11	120	5	96	23	556	25
Amphisbaenians	1	4	1	1	6	26	45	33
Crocodilians	2	25	2	9	4	50	7	32
Total Amphibians	43	11	192	6	115	30	1095	34
Total Reptiles	94	11	263	4	203	23	1115	19
Grand Total	137	11	455	5	318	25	2210	24

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TWO ABERRANT CROTALID SNAKES FROM KANSAS

Color and pattern aberrancies in crotalid snakes have been reported by Gloyd (1935, 1958), Hensley (1959), Chace and Smith (1968), Nickerson and Mays (1968), and Klauber (1972). This paper presents information on aberrancies in specimens of *Crotalus viridis viridis* and *Sistrurus catenatus tergeminus* from Kansas. The following descriptions were made from preserved specimens.

A male *Crotalus v. viridis* (KU 177024) was collected on 23 October 1977 by B. Peters 0.8 km south and 1.6 km east of Coolidge in Hamilton County, Kansas. The specimen is patternless except as noted. The dorsum is light tan with some scales having a dark brown base. The dorso-lateral scales are cream colored with flecks of gray throughout, and the venter is a uniform cream. There is no trace of pattern on the head. An irregular black band extends anteriorly on the tail *ca.* 25 mm from the base of the rattle. Gloyd (1935), and Chace and Smith (1968) reported the union of black tail rings in albinistic specimens. Scutellation is as follows: ventrals, 184; subcaudals, 25; upper labials, 15-15; lower labials, 16-16; dorsal scale rows at mid-body, 25. The rostral is noticeably enlarged. The internasals appear to be larger than normal for the species and are arranged somewhat irregularly. Gloyd (1935) commented on unusual head scalation. Snout-vent length is 89.5 cm and the tail 7.2 cm.

In March of 1972, a male *Sistrurus c. tergeminus* (KU 152341) was collected by R. Rathbon 3.2 km south and 1.6 km west of Ellsworth, Ellsworth County, Kansas. This snake has a light brown mid-dorsal stripe about three scales in width, which runs from behind the head for two-thirds the body length. This stripe is bordered on either side by a dark brownish gray stripe about two scales in width. The stripe terminates in an irregular blotch, which is followed by seven more blotches to the vent. From the vent to the tip of the tail six very faint irregular blotches are present. The ground color is dark gray, with cream dorso-lateral scales heavily flecked with brown. The venter is cream with a neavy mottling of brownish-gray, becoming progressively darker to the tip of the tail. This is apparently the first report of a striped example of the genus *Sistrurus*. Scutellation is as follows: ventrals, 146; subcaudals, 33; upper labials, 11-11; lower labials, 12-12; dorsal scale rows at mid-body, 24. The snout-length is 49.5 cm and tail length is 6.8 cm.

I thank William E. Duellman (KU) for allowing me to examine specimens in his care. Thanks also to Joseph T. Collins and Darrel Frost for their helpful suggestions. Stan Roth kindly obtained the specimen of *Crotalus viridis* and deposited it at the Museum of Natural History, University of Kansas, Lawrence (KU).

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AN EARLY PUBLISHED ACCOUNT OF THE CACTUS—CORRAL MYTH

Probably most Americans with more than a casual interest in herpetology or ornithology are familiar with the story of the alleged habit of the roadrunner (*Geococcyx californianus*) of killing rattlesnakes by surrounding them with a wall of loose cactus joints. The snake, in its frantic efforts to escape from the cactus corral either fatally impales itself on the thorns or becomes so enraged that it bites itself and dies from the effects of its own venom. According to the story, the bird then either eats the snake or else immediately goes in search of another victim.

Klauber (1956) says that this still-current myth of the roadrunner's cactus corral is widespread and of respectable age. He first heard it around the campfire about 1897, but he cites earlier literature references to the story. The earliest of these is that of Heermann (1859), who recorded the tale as hearsay without indicating that he believed it. Klauber suggested that the story probably was current long before 1859.

Recently, while searching the literature preparatory to writing a biographical article on William Gambel, I found that Gambel (1849) had published an account of the roadrunner's cactus corral ten years or so prior to Heermann's account. This may well be the earliest printed reference to the myth. Actually, Gambel heard the story several years prior to publishing it.

William Gambel was a Philadelphia naturalist who was important in the early natural history exploration of the American West. He made two trips to California and died there in 1849. During his first trip, from 1841 to 1845, he travelled widely in the area, all of which at that time was part of Mexico. Sometime during his first trip he was told the cactus corral story by "Californians," by which he undoubtedly meant the native *Californios* of Spanish or Mexican descent. I think we can assume that the myth probably was current among that people well before it was related to Gambel sometime between 1841 and 1845.

Gambel's version has the roadrunner finding a sleeping snake (he says "snake" but I suspect he mainly had rattlesnakes in mind) which the bird surrounds with joints of a round-stemmed cactus. This could refer either to cholla or prickly pear, depending on whether one interprets "round-stemmed" as meaning cylindrical or flat and circular. When the corral is finished the roadrunner drops a cactus joint on the snake, which is thus rudely

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awakened, and in its desperate efforts to escape from the corral, fatally injures itself on the cactus spines. Gambel, who was primarily an ornithologist and botanist, and later a physician as well (M.D., University of Pennsylvania, 1848), simply records the story in his account of the roadrunner without committing himself to either belief or disbelief, but his remarks imply that he thought it might be true. Gambel, whose name is memorialized in the lizard genus *Gambelia* as well as in the names of various other animals and plants, evidently was not a close student of snakes. Otherwise, the obvious fallacies of the cactus-corral tale would have been immediately apparent to him, or at least the fact that rattlers and some other snakes are very much at home in cactus thickets.

It is well known, of course, that roadrunners kill snakes, including rattlers, and often eat them. Klauber gives numerous instances of this and also cites a number of literature references, the earliest of which is that of Gregg (1844). However, these accounts of snake-killing by the roadrunner must be distinguished from accounts of the cactus corral.

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REMARKS ON DEFENSIVE BEHAVIOR OF HOGNOSE SNAKES, *Heterodon*

Death-feigning, or letisimulation, the final stage in the defensive behavior of the snake genus *Heterodon*, has long interested naturalists. One aspect of this behavior which has aroused much speculation is the adaptive significance of the belly-up position assumed by the snakes when death-feigning. This behavior has the appearance of being nonadaptive since displaying individuals, when turned belly-down by a human, often turn belly-up again. This movement by the animal is counter to human expectations for an animal playing dead and, by inference, would seem unlikely to fool a potential predator. My observations suggest that there may be an alternative explanation for the belly-up position of supposedly death-feigning hognose snakes. In fact, "death-feigning" may be a misnomer.

Platt (1969) has reviewed the literature on death-feigning in *Heterodon*, and Gehlbach (1970) has discussed broader aspects of the same topic. Both authors agree that the series of behavioral acts terminating in death-feigning in *Heterodon* is very variable, with many steps being interchanged or omitted in the repertoire of any individual. Platt (1969) listed three phases in the defensive sequence. The first is a retreat phase which contains up to four separate acts: remaining motionless, escape, escape with jerky movements and coiling of the body and pseudo-strikes. The second phase, threatening, has three subsets: spreading neck, concealing head and psuedo-strikes. Death-feigning is the third phase; itincludes extensive defecation and discharge of the anal glands as well as hemorrhaging of the oral mucosa. During this final phase, the snake turns over on its dorsum, remaining motionless.

Observation of seven individuals of *H. platyrhinos* from Missouri, Illinois and Michigan has persuaded me that death-feigning is a logical but unappreciated consequence of the previous acts. Individual snakes encountered in the field were stimulated to begin defensive behavior by beating the adjacent ground with a stick; a series of 35 mm pictures of each animal was then taken. Snakes encountered when I was without my camera were returned to my home, where they were stimulated and photographed.

Examination of these photographic series indicated a basic defensive position not fully described by either Platt (1969) or Gehlbach (1970) although it is illustrated in Plate 7, Fig. 2 of the former publication. Under moderate levels of stimulation (roughly phase 2), the snakes frequently assume a lyre-shape (Fig. 1a). An important component of this presentation is a pseudo-head, the coiled tail, presumably acting to direct aggressive moves by the predator against a less important target. In addition, the head is enlarged by lateral broadening, and frequently feces and associated materials are discharged from the cloaca. This fecal material may be smeared on parts of the body. The lyre position can be modified, but is basically maintained. In some cases, the head and pseudo-head are in close juxtaposition (Fig. 1b); at other times the head may be hidden beneath a portion of the body so that the pseudo-head is an even more obvious target (Fig. 1c).

In phase 3, the snake rolls over on its back, but the lyre position is often maintained (Figs. 1d and 1e). In extreme cases, the head is placed close to the tail which is still coiled as a psuedo-head. Typically, the mouth is open, often with the mucal lining hemorrhaging and the tongue extended. According to my observations, there appear to be two significant adaptive features of this display. One, when the snake is in the lyre position, whether on its dorsum or venter, there is a presentation of two "heads" to a potential predator. Two,

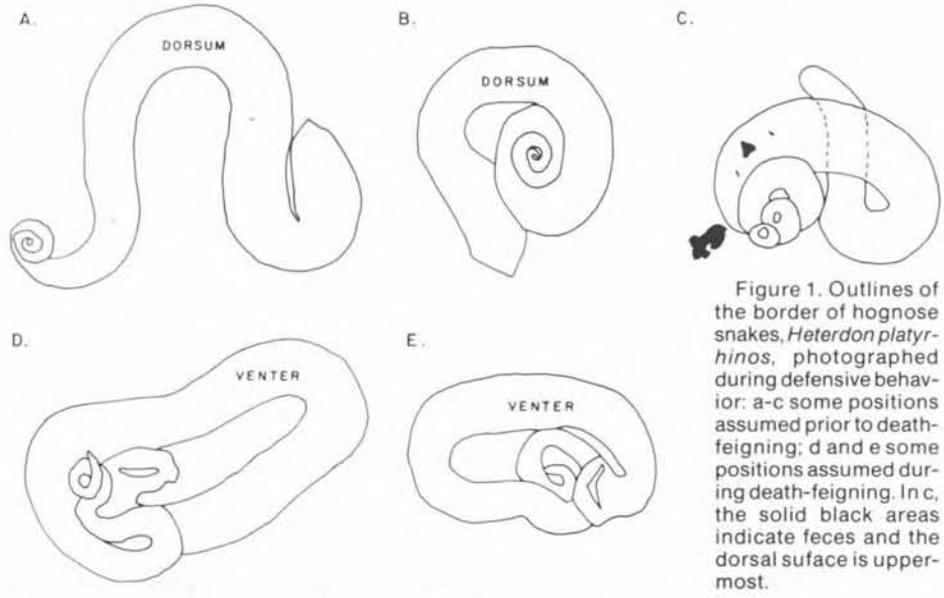


Figure 1. Outlines of the border of hognose snakes, *Heterdon platyrhinos*, photographed during defensive behavior: a-c some positions assumed prior to death-feigning; d and e some positions assumed during death-feigning. In c, the solid black areas indicate feces and the dorsal suface is uppermost.

when the snake is under the most extreme provocation and rolls over on its back, the cloaca, with its discharged feces, is displayed conspicuously next to the head and may serve as a powerful deterrent to furthur attack. The effectiveness of the fecal materials as a deterrent may be enhanced by the fact that during the display they frequently become smeared over much of the snake's body. Obviously, if my suppositions are correct, when a human or other predator flips a "death-feigning" snake over on its belly, the snake, to maximize the effectiveness of its deterrent, should roll over on its back again!

ACKNOWLEDGEMENT

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AN ELECTROMECHANICAL METHOD OF MONITORING TONGUE-FLICKERS IN SNAKES

Tongue-flicker rate has become an increasingly popular measure of arousal in snakes. It is a herpetocentric measure (Chiszar, Carter, Knight, Simonsen, & Taylor, 1976) which is useful in describing changes in activation under varying conditions. However, monitoring of tongue-flickers has been hampered by the open, unrestrained conditions under which observations have been made. Monitoring in the home cage (Burghardt, 1967; Burghardt & Pruitt, 1975; Chiszar & Radcliffe, 1976; Fuchs & Burghardt, 1971; Loop, 1970; and Sheffield, Law, & Burghardt, 1968), and in the open field apparatus (Chiszar & Carter, 1975; Chiszar, Carter, Knight, Simonsen, & Taylor, 1976; and Chiszar, Scudder, & Knight, 1976) was all done visually and recorded by hand. Studies on tongue-flicker in restrained snakes could rely upon electromechanical monitoring, which would not only increase ease of observation, but also provide a better definition of the tongue-flicker response, and probably increase reliability of the measure. The following is a description of an electromechanical procedure the authors are currently using to monitor tongue-flicker in restrained *Nerodia rhombifera*. (Fig. 1)

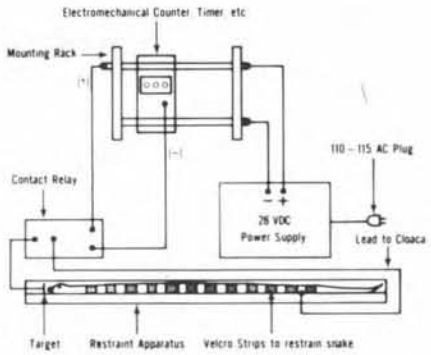


Fig. 1. Electromechanical procedure for monitoring tongue-flicker in restrained snakes.

Snakes are restrained in the apparatus described by Ward and Harrell (in press). After the animal is in place, a probe is inserted in the cloaca and taped in place using surgical tape. A metallic target is then positioned approximately ¼ inch in front of the snake's snout. The probe and the target are then connected to the input poles of the contact sensor (Scientific Prototype, drinkometer 101-K).[1] This relay is typically used to monitor lick rate in rats.

The output circuit can then be connected to a counter, timer, cumulative recorder, or other electromechanically operated device. This procedure gives an accurate record of tongue-flicker rate in the restrained snake which can be checked for reliability using visual monitoring.

In our laboratory, this procedure has been used successfully to monitor changes in tongue-flicker rate as a function of water deprivation and changes in rate when tongue-flicker is followed by water reinforcement. In the latter case, closing the contact relay pulses a water dispenser which delivers a measured amount of water via medical tubing placed directly in the snake's mouth.

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LITERATURE OF THE INTERNATIONAL ZOO YEARBOOK, VOLUMES 1-18 (1959-1978)

The **INTERNATIONAL ZOO YEARBOOK (IZY)**, published by the Zoological Society of London and originating with volume 1 in 1959, was conceived with the idea of providing a source of publication for articles dealing with any subject directly related to zoo animal husbandry and captive breeding. Volumes 1-5 were published in consecutive years to 1963, then volume 6 appeared in 1966 with an annual volume appearing to date.

Each volume contains a special section devoted to a certain aspect of zoo management, and sections concerning new developments in the zoo world, exhibits and construction, zoo education, and occasionally diseases and treatments. Also in each is a census of rare animals in captivity, listings of reported captive breedings during previous years, a subject index to the previous volumes, and a listing of zoos and aquaria of the world, sometimes including staff members.

All volumes contain articles relating at least indirectly to reptiles and amphibians, although most are featured in later years. Volume 9 (1969) includes a special section devoted to herpetofauna in captivity as will volume 19 which is scheduled for publication sometime late in 1979.

This listing includes the 164 articles from volumes 1-18 (1959-1978). They are grouped in general categories with authors listed alphabetically as follows: general titles (24 articles), exhibits and construction (16), diseases and treatments (8), amphibians (7), chelonians (17), crocodilians (19), Rhynchoce-

phalia (5), saurians (28) and snakes (41). Each citation includes author(s), date, title, volume number and pagination. One article (David, 1970) dealing with the captive breeding of two taxa has been listed twice; all others have been placed in the category in which they most nearly fit.

Because of its relative expense and the fact that it is generally unavailable in most libraries, **IZY** is a reference often overlooked. In some cases, articles have included valuable behavioral observations and first published records of reproduction on various taxa. This listing will acquaint those unfamiliar with the herpetological literature published to date. Additional listings will be published for future volumes at irregular intervals.

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A NEW TRAP FOR BASKING TURTLES

During the course of studies conducted at Cranberry Creek Marsh, Jefferson County, New York (Petokas, 1978), a new trap for basking turtles was designed, constructed and tested. The new trap, incorporating some of the basic designs of Lagler (1943) and Cagle (1950), was found to be an effective method of capturing basking turtles. While only painted turtles (*Chrysemys picta*) were captured, any turtle that habitually basks out of the water may be taken by this method.

The overall outside dimensions of our trap are: length, 105 cm; breadth, 73 cm; and depth, 14 cm. Traps are made from 19 x 178 mm pine planking, 127 mm aluminum flashing and 25 mm mesh chicken-wire. The planking is cut into suitable lengths to form a rectangular basking platform (Fig. 1). Each plank end is beveled so that all sides of the platform slope upwards at an angle of about 15 degrees. Wood screws and strips of scrap material (wood or metal) are used to fasten the planks at each corner. The flashing is cut into strips of suitable length, creased along the center-line and stapled to the upper surface of each plank. Lastly, a chicken-wire capture basket is stapled to the underside of the wooden platform. Urethane foam may also be added beneath the platform to adjust flotation.

The basking trap described herein may be used in any aquatic habitat having water deep enough (ca. 12-15 cm) to cover the base of the sloping platform. Our experience has been that the traps are most effective when set in beds of submerged or floating aquatic plants where few natural basking sites exist. Most turtles bask at the top of the sloping platform, and when leaving their perch often enter the trap rather than walk back down the ramp. Once inside the capture basket, turtles are deterred from climbing out of the trap by the smooth surface of the metal flashing.

The design of our trap provides several advantages over most contemporary capture methods. It is inexpensive and simple to construct, and requires no attendance except to remove captured turtles. The rectangular shape reduces the overall size and weight of the trap without decreasing its efficiency. Lastly, the trap is efficient because it captures both juveniles and adults, and because it retains most entering turtles.

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We would like to thank Michael Wasielewski and Lewis Smith for their assistance during the construction of this trap and its various prototypes.

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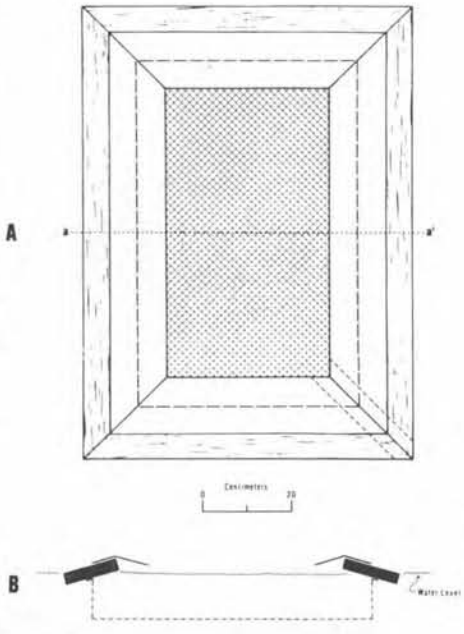


FIGURE CAPTION

Fig. 1.—Diagram of basking trap. Top view is depicted in A; cross-sectional view through a-a' is shown in B. The capture basket is represented by cross-hatching in A and the broken line in B. Heavy broken lines in A indicate a bend in the metal flashing and also demarcate the obscured inside margin of wooden planking shown by the grain pattern in A and the hatching in B. Light broken lines in the lower right-hand corner of A outline an arrow-shaped support.

HERPETOLOGY AT THE UNIVERSITY OF MICHIGAN

The University of Michigan has had a long and distinguished history of research on amphibians and reptiles and today's large numbers of faculty, staff and students with their varied interests are maintaining that tradition. On campus, the centers of activity are located in the Museum of Zoology - Alexander G. Ruthven Building, the Edward H. Kraus Natural Sciences Building, and the Amphibian Facility, and off campus, they are to be found as close as the University's E.S. George Natural History Reserve and the Douglas Lake Biological Station to as distant as Australia, Brazil, Panama and the Seychelles Islands.

Most of the herpetological activities in the Museum of Zoology are associated with the Division of Amphibians and Reptiles. The Division's curators are Arnold Kluge, Ronald Nussbaum and Donald Tinkle (also serving as Director of the Museum), and they are ably assisted by curatorial technicians Liz McGhee and Gary Breitenbach. A five-year Collection Management grant from the National Science Foundation has helped immeasurably to curate the Division's extensive collections of fluid preserved specimens, skeletons, x-rays, Kodachromes, audiotapes and frozen tissues. In addition to overall collection improvement, the Foundation's support has enabled the staff to explore new areas of curation, such as the collection and maintenance of nontraditional data (*e.g.*, genealogies, weights, ages, competition effects, color in life, and karyotypes), and to develop a computer management system of all catalog information, both traditional and nontraditional. Also housed in the Museum of Zoology is the office of the Survey of Threatened and Endangered Species of Amphibians and Reptiles of the State of Michigan which is staffed by Paul Feaver and Laurie Vitt.

The herpetological research of the Museum's staff and students includes both comparative and experimental approaches, and employs a wide variety of theories, methods and subjects as the following brief review documents. Kluge continues to develop his interest in the theory of phylogenetic inference, and he is completing a quantitative study of sphaerodactyline lizard relationships. Also, the first stage of a long-term study of sexual selection, territoriality and parental care in gladiator frogs (*Hyla boans, H. crepitans, and H. rosenbergi*), has been concluded with his fourth field season in Panama. Nussbaum has developed a major research program on caecilian biology, and he is completing a systematic study of the family Ichthyophiidae. Coupled with this primary interest he has spent considerable time in the Seychelles and Africa, and his extensive collections have led him to consider the origin and evolution of the insular herpetofaunas of the Indian Ocean, and to a reconsideration of some general theories of island biogeography. He is also involved in a long-term study of the life history and demography of the short-horned lizard (*Phrynosoma douglassi*) in Oregon. Tinkle continues to pursue a well-established program of research on life history evolution in reptiles. At present he is concentrating on very long-lived species (turtles), mainly on the George Reserve, with particular emphasis on measuring variance, over time and among ages, in life history parameters, including reproductive effort. He is also finalizing two long-term lizard field studies (one in its tenth year) that have involved considerable experimental manipulation in attempting to understand both intraspecific and interspecific competitive effects on life histories and population dynamics of lizards.

Museum postdoctoral students with herpetological research interests include Feaver and Vitt and Justin Congdon and Art Dunham. Congdon has taken a total energetics approach to understanding life histories and in particular reproductive effort. Presently, he is studying the painted turtle (*Chrysemys picta*) and four species of snakes (*Thamnophis sauritus, T. sirtalis, Nerodia sipedon* and *Coluber constrictor*) on the George Reserve and his methods include doubly-labeled water, analysis of total lipid cycles and bomb calorimetry of soma and eggs. Dunham is most interested in the structure of reptile communities, particularly desert lizards, and he emphasizes the experimental approach. He has just completed a long-term study as his Ph.D. dissertation of *Sceloporus merriami* and *Urosaurus ornatus*, which focused on environmental predictability, food, and growth rates, and he was able to rigorously test current theories of interspecific competition. Recently, Feaver completed a demographic study of the northern water snake *Nerodia sipedon* on the Geroge Reserve as his Ph.D. dissertation. He is now comparing the demography of natricine snakes, as well as summarizing information on the reproductive strategies of snakes in general. Vitt's herpetological interests include reproductive strategies of reptiles, resource partitioning in lizards, tail autotomy and other caudal adaptations in lizards, and the ecology of tropical lizards and snakes. He recently returned from a 13-month field study in the xeric region of Pernambuco, Brazil, where he accumulated considerable ecological data on several species, in cooperation with Paulo E. Vanzolini, Museu de Zoologia.

Alan Jaslow, Ed Hover, Cindy Kagarise, Scott Moody and Peter Tolson are predoctoral students in the Museum of Zoology with advanced programs of research on amphibians and reptiles. Jaslow has just returned from two years in Panama where he studied the dynamics of larval anuran communities in wet and dry seasons. In addition, he was able to study *Atelopus* reproduction and behavior, and he and Kluge have finished a detailed study of chorusing behavior and individual communication in several species of hylid frogs. Hover's thesis research concerns a color polymorphism in a New Mexico population of *Urosaurus ornatus*. He has combined studies of behavioral interactions in controlled enclosures with a field investigation of life history and social organization. Kagarise's general interests include mating systems, communication and parental care in anurans. Her thesis research centers on the reproductive biology and mating systems of *Bufo canorus* and *B. exsul*, with particular emphasis on the mating strategy of males in high density aggregations. Moody, a recent recipient of a German Academic Exchange Scholarship, is finishing his doctoral study of the phylogenetic relationships among fossil and recent agamid lizards. He has taken his data from a wide variety of systems, for example osteological and neurological, and he has analyzed these with a battery of competing phylogenetic algorithms. He has related his phylogenetic hypotheses to vicariance biogeographic theory and the facts of continental drift. Tolson is carrying out a biochemical systematic study of species in the boid snake genus *Epicrates*. He is using starch-gel electrophoresis of selected liver and muscle tissue enzymes, thin-layer and gas chromatographic/mass spectrographic analyses of the lipid secretions of the anal scent glands, and DNA-DNA hybridization. He is testing the current phylogenetic and zoogeographic hypotheses for the group.

Herpetological studies in the Natural Sciences Building are centered in the laboratories of William R. Dawson (Chairman, Division of Biological Sciences), Carl Gans and Glenn Northcutt. Dawson's interests in amphibians and reptiles primarily concern their physiological and behavioral responses to temperature. Within this area he has conducted research on aerobic and anaerobic metabolism, respiratory mechanisms, muscle physiology, water balance, ion excretion, and behavioral thermo-regulation, working primarily with lizards. His laboratory is well equipped for such studies, as well as for ones involving various biochemical procedures pertaining to analysis of body composition and determination of activity of metabolic enzymes. His current work involves analysis of thermal exchanges of the Galapagos Marine Iguana in its natural habitat. Recent research by graduate students in his laboratory has dealt with activity physiology of lizards and turtles, physiological and behavioral adaptations of *Bufo boreas* to montane situations, and effects of exercise training on metabolic capacities of *Rana pipiens*. Dawson has participated in several symposia on reptilian physiology, and he has served as Coeditor of Vol. 5A (Physiology) of the *Biology of the Reptilia*. Gans's laboratory is designed to study aspects of the functional morphology of vertebrates, with emphasis on feeding, locomotion, and breathing adaptations. He is particularly interested in the general adaptive biology of hiding or burrowing squamate reptiles. Two of Gans's graduate

students, Brian Clark and Thomas Scanlon, are studying the feeding and locomotive adaptations of a variety of reptiles. Gans is also continuing his systematic studies of amphisbaenians and uropeltid snakes. At present, Gans is a Guggenheim Fellow in Australia where, among other things, he is studying the ecology and behavior of crocodiles. He is currently editor of *The Biology of the Reptilia* and *The Journal of Morphology*, and he is president-elect of the American Society of Ichthyologists and Herpetologists. Northcutt's research concerns the evolution of vertebrate brains. He focuses on the neuroanatomical substrates underlying major behavioral adaptations, and for the present he is most interested in the neurobiological adaptations accompanying the tetrapod transition. He is a Guggenheim Fellow on sabbatical leave at the University of California, San Diego, where he is continuing his investigations of the evolution of the telencephalon of Amphibia and lung fishes. His recent research on the forebrain and midbrain organization in lizards has provided a much needed new insight into the phylogenetic relationships of this difficult group.

George Nace (Director) and Chris Richards are the senior staff members of the Amphibian Facility. The Facility's major efforts are devoted to developing genetically heterozygous strains for general research use, inbred and homozygous lines for special studies and mutant lines for specific studies. *Rana pipiens, Bombina orientalis* and *Xenopus* are the taxa of greatest concern. Richards is investigating linkage of isozyme loci, sex reversal and steroid effects, and the histocompatibility complex in *R. pipiens*. She is also continuing her research on the genetics of color dimorphism in African reed frogs of the genus *Hyperolius*.

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DONALD W. PYLE

A tragic accident on the 5th of June 1979 took the life of Donald W. Pyle, Assistant Professor of Biology at Skidmore College, Saratoga Springs, New York. Don was conducting field research with me on a Timber Rattlesnake population in the Tongue Mountain region in northeastern New York when he fell from a rocky ledge.

Don Pyle was a behavioral geneticist and evolutionary biologist with a strong interest in natural history. Although not known as a herpetologist, Don rapidly became interested and deeply involved in our joint population study begun in spring 1978. Don was particularly intrigued by the selective factors involved in the maintenance of the color polymorphism of this species; this aspect of our work "bridged the gap" between field ecology and Don's strong interest in population genetics and natural selection.

Don Pyle was born in Oak Park, Illinois, on May 11, 1949. He graduated cum laude from the University of Illinois in 1971 with a bachelor's degree in biology. He received his master's and Ph.D. degrees from Arizona State University in 1972 and 1975. His doctoral work concerned the genetics of geotactic maze behavior of *Drosophila*. From 1975-1977, he did postdoctoral work at Indiana University and North Carolina State University. He published some dozen papers from 1976-1979 in genetics and behavior. His work appeared in such respected journals as American Naturalist, Genetics, Behavior Genetics, Nature, and Evolution.

Don joined the faculty of Skidmore College in the fall of 1977. He became a trusted friend and close colleague in the Biology Department, and he quickly established himself as a competent and energetic teacher, well respected by his students. This strong student concern was evidenced by their enthusiastic response to a permanent memorial award which they established in his name.

My feelings are best expressed in a statement written for Don's Memorial Service held shortly after his death:

A year and a half in the field together in the seasons of change, spring and fall, in an outdoor setting of beauty, biological diversity, and ruggedness, brought my colleague, Don Pyle, and me into harmony with each other. A harmony of thinking about nature and the selection pressures leading to what we were beginning to learn; a harmony of feeling a love and respect for the difficult terrain of our study area and its familiar slopes we forced our legs and lungs to overcome but never conquer; a harmony of accepting the routine tasks of recording data in our joint research work; and a harmony of admiration and respect for the many individual "tigers of the talus," as Don called them, whose behavior and natural history we were beginning to understand.

Our single driving oneness was to know. To know the sorts of information we sought was not going to be done quickly or easily. Our goal for June was to let four timber rattlesnakes, each "communicating" with us by surgically inserted radio transmitters, teach us what this secretive reptile does during the course of its seasonal movements. Firmly convinced that such data would touch both theory and practicality, we proceeded to set up and plan a project we felt would be scientifically productive. We melded two aspects of biological science. Don provided a theoretical framework built on his strong intellect and an acute perspective of evolutionary thinking that cut across all groups of organisms; I provided the empirical background on this particular reptilian species that currently fascinated us. Together, we felt and openly confessed that our study was a unique blend of approaches in an unusually fortunate working relationship. And another equally strong spirit characterized the past year: we became close personal friends. Our allegiance to each other was blossoming and continuing to grow.

The loss I feel from Don's tragic death is deep and severe, as it is for us all. Countless thousands of mental visions re-run the traumatic events of the difficult moments of discovery, resuscitation, and rescue of my friend. I know Don must not have suffered. His life was full and rewarding, both professionally and philosophically. He loved nature, from the western deserts to the eastern woodlands. He would never have wanted a bed with buttons, signals, and tubes. His triumph was his ability to carry out many diverse interests and to delight others with his style of thinking about the world. I benefited immeasurably from having known Don; for this I will always be grateful.

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HERPETOLOGICAL HUSBANDRY

REPTILE REPRODUCTION AT THE FORT WORTH ZOO

The reptile department of the Fort Worth Zoo ended 1978 with a total of 19 varieties born or hatched during the calendar year. Of these, seven forms were new to our collection, bringing the total number of captive-bred species to well over 50 since 1971.

We were again quite successful with our crocodilian program which includes *Alligator mississipiensis*, *Caiman crocodilus yacare* and *Osteolaemus tetraspis*. Although we have had success breeding these species in previous years, 1978 was the first year that eggs and hatchlings were produced from all three in a single season (see photo).

Another significant birth involved the Malagasy ground boa, *Acrantophis dumerili*. A female on breeding loan from the Columbus Zoo copulated with one male in late November 1977. She remained off-feed until 19 July 1978 when ten young were born. As far as we have been able to determine, this is the second successful breeding of this rare boa in a United States zoo. A one-to-one sex ratio in this brood will enhance the future breeding potential of this form in both collections.

Although 19 varieties might be considered a respectable figure for a single season, this actually represents less than ten percent of the reptile species housed in the zoo's collection. With the addition of young from 1978, approximately 30 percent of our total collection has been bred in captivity here and elsewhere. It is reasonable to assume that in the near future, zoos will be forced to depend upon captive-bred stocks of reptiles as they presently do with certain species of birds and mammals; and zoos that cannot breed or otherwise obtain captive-bred specimens will see their collections dwindle or be restricted to the more common native varieties. We are currently experimenting with hibernation and related techniques which may later prove essential in the reproductive cycles of certain forms.

...from AAZPA Newsletter, 20(3): 11, 1979.

HUSBANDRY INFO REQUESTED

The Oklahoma City Zoo has recently had Puerto Rican boas (*Epicrates inornatus*) reproduce and would like infomation on the husbandry of this species.

Persons or organizations with information involving reproduction, behavior and food habits of juveniles should contact Len West, Herpetarium, Oklahoma City Zoo, 2101 NE 50th, Oklahoma City, OK 73111. (405) 424-3344.

...from AAZPA Newsletter, 20(3), 1979.

DECEASED ALLIGATOR SNAPPERS NEEDED

Recently deceased specimens of adult Alligator snapping turtles (*Macroclemmys temminckii*) are requested for the study of tongue musculature. Specimens should be frozen immediately upon death. Head specimens or entire bodies are acceptable. Potential donors are requested to contact: Dr. Bob Winokur, University of Nevada, Las Vegas, Department of Biological Sciences, Las Vegas, NV 89154. (702) 739-3399.

...from AAZPA Newsletter, 20(3), 1979.

COMBAT BEHAVIOR IN THE DUSKY PYGMY RATTLESNAKE, *SISTRURUS MILIARIUS BARBOURI*, IN CAPTIVITY

Two male *Sistrurus miliarius barbouri* have been maintained in my private collection for about one year. Both snakes are from Alachua County, Florida and are maintained together in a 38 liter (10 gal.) aquarium with a paper substrate and cork bark for hiding. The temperature of the cage at the time of these observations varied between 20-27°C (the room has since been cooled down to allow for hibernation). Each snake receives a newly weaned white mouse every week or ten days.

On several occasions, I have observed combat behavior between these snakes. Such behavior has often been reported for *Crotalus* (Lowe and Norris, 1950; Shaw, 1948; Carpenter *et al.*, 1976) and for other snakes (Bogert, 1966; Lowe, 1948; Shaw, 1951; and, others), but has been reported only once in *Sistrurus* (Carpenter, In press) so I feel that my observations are worthy of note.

Each time combat was observed, it appeared to be induced by the introduction of two dead food items and was always initiated by the larger snake. Typically, the "aggressor" would approach and attempt to entwine his body about that of the other. Then, both snakes would raise the foreparts of their bodies into the air while intertwining and attempting to force each other to the ground. In the majority of cases, the larger snake was successful in forcing the smaller to the ground. The snakes were never seen to rattle or attempt to bite during combat. If they were separated to opposite corners of the cage during combat, they immediately sought each other and began again. The combat would finally end when one or both appeared to tire of it. This was usually, although not always, the smaller of the pair. After the display was completed, each would consume his mouse.

The only explanation I have for this behavior is that it is an instinctive reaction to excitement, in this case the introduction of food items. Sutherland (1958) reported food-related combat in *Crotalus horridus* and *Agkistrodon contortrix*, and the explanatory opinions of different authorities were varied. Such behavior usually falls into either the category of aggressive behavior or part of courtship activity (Carpenter, 1977). In no case has either of my snakes been so disturbed by the ritual that it refused to feed, nor has the one who appeared dominant attempted to consume both mice. Two male *Sistrurus ravus* at the Atlanta Zoo often exhibit similar behavior when being fed.

ACKNOWLEDGEMENTS

I wish to thank Scott Simpson and Tina Beasley who gave me the snakes and R. Howard Hunt for his helpful comments and advice. I thank Charles C. Carpenter for a copy of his unpublished *Sistrurus* paper and the staff of the Reptile Department, especially Dennis W. Herman, for their help.

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NOTES ON CAPTIVE REPRODUCTION IN *ECHIS COLORATA* (SERPENTES: VIPERIDAE)

Palestine saw-scaled vipers (*Echis colorata*) have produced eleven clutches of eggs during the years 1971 through 1978 in the reptile collection of the Columbus Zoo, Columbus, Ohio. Seven clutches have been produced by a pair obtained from commercial sources, the male acquired 25 June 1968, and the female on 22 January 1964. Four clutches produced as a result of sibling matings between progeny of this pair hatched 3-5 August 1971.

The older pair has been maintained since 1969 in a display cage 68 x 56 x 52 cm high. The 1971 animals have been maintained since 1976 in individual cages throughout most of the year and combined into groups each spring. In 1977, they were placed in a single group of 2 males and 3 females on 14 April and were separated 30 May. In 1978, they were placed in groups of one pair and one trio of 1 male and 2 females on 28 February and were separated 1 May. Groups were housed in large aquaria of various sizes. Since 1976, all animals have been kept on a photoperiod cycle approximating that of 30 degrees N latitude.

Courtship and copulation have seldom been observed. Courtship was observed in the older pair on 7 March 1978. Copulation was observed in a pair of the 1971 animals on 19 April 1977. These behaviors were in evidence when personnel arrived in the morning and were discontinued shortly thereafter. The infrequency of the observed reproductive behavior in this form is in sharp contrast to the observed behavior of *Echis carinatus* in this collection. Specimens of *E. carinatus* which were maintained in a manner similar to that of the *E. colorata* have been frequently observed in courtship, copulation and male combat behavior throughout the day.

Dates of egg laying and hatching, clutch sizes and measurements of eggs for all clutches are given in Table 1. Eggs are smooth shelled, white and adherent immediately after oviposition. Shells are flexible and sufficiently translucent that blood vessels are often visible shortly after laying. Small, unshelled infertile masses have accompanied six clutches. The clutches laid 18 June 1973, 10 June 1977, 6 June 1978 and 21 June 1978 were each accompanied by one such mass. Two masses accompanied the clutch laid 24 June 1977, and three acompanied the clutch laid 7 June 1978.

On four occasions, females have laid a single egg of normal appearance several days prior to depositing a clutch. These occasions are summarized:

1964 female

1 egg (not measured) 13 June 1973 (clutch laid 18 June)

1 egg (38 x 25 mm) 6 June 1977 (clutch laid 10 June)

1971 female #1

1 egg (not measured) 1 June 1978 (clutch laid 7 June)

1971 female #3

1 egg (28 x 19 mm) 17 June 1978 (clutch laid 21 June)

These early eggs have not produced hatchlings and are not included in Table 1.

Eggs laid prior to 1977 were incubated in the service area of the reptile building. Temperatures were not monitored but can be reliably assumed to have frequently exceeded 32° C during incubation. Eggs laid in 1977 and 1978 were maintained in a modified commercial poultry incubator at 28° - 30° C. This change may be reflected in slightly longer incubation periods.

Prior to 1977, eggs were laid on the gravel substrate used in cages. Since 1977, gravid females have been placed in a cage with slightly damp sphagnum moss as a substrate prior to egg laying, and all clutches have been laid on that substrate. This change may be involved in an increase in the size of the eggs, particularly the short axis, since that time.

One egg from the 6 June 1978 clutch produced twins, attached to a single yolk within the egg. An egg from the 10 June 1977 clutch, opened four days after the remainder of the clutch had hatched, contained a dead, fully formed 183 mm snake. The snake had not cut the eggshell, and was found with one fang and the opposing teeth of the lower jaw deeply imbedded in its body near the base of the tail.

Hatchlings have shed 8 - 12 days after leaving eggs. The behavior, characteristic of the genus, of rubbing the obliquely keeled scales of one portion of the body against those of another portion, has been observed within two days after hatching, although sound produced by hatchlings was not audible at a distance of approximately 300 mm. Hatchlings have begun feeding on newborn mice at intervals varying from within one week after the first shedding up to fourteen weeks. In contrast to newborn *E. carinatus*, none of the hatchling *E. colorata* has fed on crickets. Young of both taxa have fed more readily when maintained at temperatures above 27° C. Feeding behavior of hatchlings appears similar to that of adults. Prey is usually struck from less than 1/3 the body length of the snake, and gripped tightly in the jaws for one to four minutes. Sufficient force is exerted to noticeably deform the shape of the prey. Often the body of the snake will be tensed and rotated on the longitudinal axis during prey seizure. In most cases, prey is not released before swallowing.

Viable *E. colorata* hatchlings have varied from 181 to 218 mm total length, with most being 195 - 215 mm. Those which have begun feeding on a regular basis shortly after hatching have reached 260 - 285 mm total length in their first year, and 350 - 380 mm total length in their second year.

Both males and females of the 1971 clutch were capable of producing viable young in their fifth year. At the time of her first egg laying, female number 5 was the smallest individual of the 1971 snakes, at 574 mm total length. An additional 1971 female, 613 mm total length, contained eleven oviducal eggs, 11 - 14 mm in diameter, when killed by a bite from a littermate 14 April 1977.

The age of the 1964 female is noteworthy, as it is currently listed by Bowler (1977) as the longevity record for the taxon. Although exact age cannot be determined, it was approximately 295 mm on 22 January 1964. This would correspond to growth of the most rapidly growing second year young produced in this collection. Thus, it was at least in its fifteenth year when the 1978 clutch was laid, but no reduction in reproductive capability has yet occurred.

All data prior to 1976 were collected and maintained by the late Louis J. Pistoia, Curator of Reptiles at the Columbus Zoo until his death in May, 1976.

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Table I. Number, Size and Dates of Laying and Hatching of *Echis colorata* Eggs

LAYING DATE	NO. EGGS	NO. HATCH	LENGTH (mm) RANGE	LENGTH (mm) MEAN	WIDTH (mm) RANGE	WIDTH (mm) MEAN	DATE HATCHING	DAYS INCUBATION
1964 female								
July 7, 1972	7	7	-	-	-	-	Aug. 3-5	43-45
July 7, 1972	5	0	-	-	-	-	-	-
June 18, 1973	7	3*	31-38	33.3	19-21	19.9	July 28	40
June 15, 1974	7	7*	31-42	33.7	18-20	19.3	July 28	43
June 26, 1976	8	5	30-35	32.3	19-23	20.8	Aug. 5	39
June 10, 1977	7	4*	32-36	34.0	22-24	23.0	July 27	47
June 6, 1978	12	11†	30-37	33.7	23-28	24.8	July 19-24	44-49
1971 female #5								
June 24, 1977	5‡	2	37-41	40.5	17-20	18.5	Aug. 12-14	48-50
June 15, 1978	1	1	-	47.0	-	19.0	July 30	45
1971 female #1								
June 7, 1978	4	1	34-40	36.5	20-27	23.0	July 31	53
1971 female #3								
June 21, 1978	9	8	29-37	33.6	20-24	22.4	Aug. 10-12	50-52

* One animal died within 24 hours of hatching
† Includes one set of twins
‡ One egg not measured, adhered in center of clutch

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BOOK REVIEWS

THE SAND LIZARD, LACERTA AGILIS. Edited by A. Jablokov. Pritkaja Jascherica Government Publishing House, "Nauka Science" Moscow. 1976. 376 pp.

This is the first Russian monograph about all aspects of the biology of one lizard species. *Lacerta agilis* is a common European species, and has an important role in its biocenosis. The authors — 36 specialists — thoroughly review the biology of *L. agilis*, and it is clear that though a well known, common species, much remains to be learned by studying this "known" animal through new, more detailed, high level methods. The authors use materials from Russian and European collections, literature, and results of their own research. The general editor for this book is Dr. A. Jablokov; it contains works done at the Institute of Biology of Development and Institute of Evolutional Morphology and Ecology of Animals (Academy of Sciences of USSR, Moscow). The specialists at these institutes are interested in *L. agilis* as a common model for studying evolution of species, especially evolutionary processes in one species and the role of various factors in selection, isolation, etc. However, the amount of general research presented on aspects of ecology and evolutionary problems is relatively small.

Chapters are: 1) Range and Habitat by N. Scherback and N. Ostashko — includes known range of *L. agilis* based on museum collections. The range is satisfactorily studied in the USSR (except for the eastern areas) and northwest Europe, but is poorly known in China, France and Yugoslavia. The authors exclude from the range of *L. agilis* Spain and nearby parts of France, but Alfredo Salvador includes *L. agilis* in the herpetofauna of Spain in local isolated areas of the Pyrenees (see A. Salvador "Guia de los Anfibios y Reptiles Espanoles" Madrid, 1974). Among the factors affecting *L. agilis's* existence is an anthropogenic one, in that increased human activity (urbanization) limited the populations of *L. agilis* in Europe, while some different changes of natural habitats in USSR (artificial forests, roads and fields) can support lizard populations. This factor needs special attention in new research and conservation activity. The readers of this book would profit from a more detailed discussion of historical factors affecting distribution and existence of *L. agilis*.

Chapter 2: Systematics by I. Darevsky, N. Scherback, and G. Peters - This chapter discusses in detail the characteristics of *L. agilis* subspecies based on 3658 measured specimens and diagnoses 9 subspecies as follows: Eastern group: *L. a. grusinica* Peters, 1960; *L. a. boemica* Suchov, 1929; *L. a. brevicaudata* Peters, 1958; *L. a. iorensis* Peters and Muskhelischiwili, 1968; *L. a. exigua* (Eichwald, 1830); Western group: *L. a. agilis* Linnaeus, 1758; *L. a. chersonensis* Andrzejowski, 1832; L. a. euxinica Fuhn and Vancea, 1964; *L. a. bosnica* Schreiber, 1912. According to the authors, *L. agilis* evolved in the Caucasian region. The variability of *L. agilis* shows that divergence of forms continues yet, especially among eastern subspecies; the forms from Siberia need further study as they are really different from the nominate subspecies, especially in some isolated populations in montane Siberian areas (Altaj, East Sajan, etc.). The problems of variability and subspecies status are summarized in this chapter, and may be useful for development of new investigations.

Chapter 3: Morphology by A. Baranov, A. Valecky, A. Jablokov — This chapter is generally based on earlier investigation, and summarizes known literature in this field, particularly Russian. It contains information about size, skin structure, coloration, and discusses subspecies whose origin is based on color aberrations (*erythronotus, rubra, immaculata, punctata, nigra*) according to investigations of authors. The description of skeleton, muscles, respiration, blood systems, sensory structures and internal systems are not new and are relatively short, reflecting little new research in these fields, especially in nervous systems, internal organization of lizard anatomy and physiology.

Chapter 4: Physiology and biochemistry by J. Antipchuck and L. Smelkovsky — This chapter is like chapter 3 in level of investigation, and summarizes known information on this field. The authors frequently use information about other reptilians as analogy to *L. agilis* in discussing processes of respiration, thermoregulation and other physiological functions. This chapter contains previously unpublished information about trace element concentrations in *L. agilis* collected by L. Smelkovsky. This chapter shows how little is known about physiology and biochemistry of *L. agilis* today.

Chapter 5: Environmental habitats by M. Tertishnikov — This chapter describes various environmental factors: types of biotopes, including natural and cultural biotypes; lizards' selection of various biotopes; wintering; humidity; affects of agriculture; soils; illumination; territoriality; and types of burrows. This chapter is based on earlier authors' research and summarizes known Russian literature. This material shows only behavior of lizards in nature, and excludes experimental observation about biotopic selection by lizards, territoriality, diel activity, and seasonality.

Chapter 6: Feeding by G. Lukina — It is a very detailed summary of literature, particularly Russian, about this aspect, including food type, quantity, predation strategy, seasonality and annuality of food species, plus variations by biotopes, sexes, sizes, etc.

Chapter 7: Breeding by A. Baranov, A. Strelcov, M. Tertishnikov — This chapter only reviews early known information on breeding of *L. agilis*.

Chapter 8: Development and growth by F. Danieljan, A. Simojan, A. Jablokov and E. Smirina — This chapter contains original observations and laboratory experiments by the authors on embryonal/post-embryonal development, eggs, and incubation. It discusses the problem of identification of *L. agilis* age groups by various methods. According to Smirina, the identification of age is possible by skeletal characteristics.

Chapter 9: Movement and Migration by M. Tertishnikov — Detailed description of early authors' investigations is presented with an analysis of Russian literature, but some aspects of migration are fragmental and need more experimental study.

Chapter 10: Behavior and Activity by M. Tertishnikov — This chapter discusses the early known information about some aspects of lizards' natural activity — seasonality, diel activity, and some aspects of behavior (especially breeding behavior) — known from Russian investigations. There are detailed descriptions of drinking and burrowing, but some important problems of behavior are not thoroughly discussed (for example, social behavior, aggression, territorial behavior). This is the result of little Russian research in ethology, and little information about behavior of *L. agilis* from western Europe. However, the authors show that *L. agilis* has relatively complicated behavior that may be changing. The discussion of lizard behavior in captivity is comparatively short; however, the few observations may be very useful for understanding lizard behaviorisms and their variability. For example, the book doesn't note anything about lizard learning, but the research of I. Beritashwili can contribute some notes about functions and possible characteristics of lizard learning.

Chapter 11: Population Structure by A. Jablokov - The author discusses the literature about *L. agilis* populations. The population structure is relatively complicated and varies in different parts of the range.

Chapter 12: Parasites by V. Sharpilo and L. Schur - In this chapter, the authors cite known parasites collected from *L. agilis*, but do not treat the affects of this parasitism. Dermal tumors (Papillomata) in *L. agilis* are described (see H. Reichenback-Klinke and E. Elkan *Diseases of Reptiles*. 1971. TFH, Inc. publication).

Chapter 13: *L. agilis* as consumer and producer by M. Tertishnikov - It is a theoretical chapter of *L. agilis's* part in its biocenosis.

Chapter 14: Population dynamics by A. Baranov and A. Jablokov and, Chapter 15: Biomass by A. Jablokov and M. Tertishnikov -These chapters include a summary of literature about lizard abundance, method of calculation, relative number of *L. agilis* in various biotopes, and the dynamics of various populations.

Chapter 16: Practical Importance by N. Scherback, M. Tertishnikov, V. Kotljarevskaja, V. Sharpilo, A. Audrushko - This chapter analyzes the economic role of *L. agilis*. It is deemed very useful in agricultural settings as a consumer of harmful insects. *L. agilis* is cheaper to use and easier than chemicals according to the authors' calculations.

The management of *L. agilis* artificial populations relies upon continued introduction.

Generally, this book is very useful for various specialists as a summary of known material about *L. agilis* and to underscore problems in need of detailed investigation. For example, it identifies as an important factor in *L. agilis's* life history "Homo scientificus" (collectors who kill many lizards for research and experiments), a new problem in *L. agilis's* conservation. This book will provide a high-standard compendium for many years, but a very limited circulation which stopped wide distribution of this book will hamper its utility. The book is especially rare in western Europe, a major part of *L. agilis's* range. It is hoped that updated editions of this monograph will be prepared as time goes on. For example, not included in this edition is a very interesting description of a captive breeding colony of *L. agilis*. It is briefly noted by the authors. Soviet herpetologists are now planning the production of new monographs about *Rana terrestris, Eremias, Hynobius,* etc., and this first monograph may be a very useful model in writing this type of book.

The excellent cooperation among the several authors results in inclusion of many new unpublished details about *L. agilis* from their own observations, plus early research that increases the value of this book as a new, original monograph in world herpetology. It is well written and easily understandable for both specialists and any others interested in aspects of *L. agilis's* biology.

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IDENTIFICATION MANUAL TO THE AMPHIBIANS AND REPTILES OF FLORIDA, by Ray E. Ashton, Jr. Florida State Museum Interpretation Series, no. 1. 1978. Price $2.00 + .50 postage (4% sales tax to Fla. addresses).

Like its Kansas progenitor (Karns, *et al.* 1974), this guide is intended to make identification of a regional herpetofauna as painless as possible for novices. It accomplishes this objective via a series of easily followed flow charts identical to those developed and tested for the Kansas guide (nothing succeeds like success). One hundred thirty-four taxa are presented with very few snafus. The hognose snake reversal ("Snake" page 18) has been corrected. Amusingly, the Kansas guide has a similarly corrected error in the same genus — emulation can go too far! The Green Water Snake block ("Snake" page 19) remains titled only "Water Snake." The drawings provide adequate aid to final identification of most forms, though they are of slight utility in distinguishing similarly patterned, related taxa and several small snakes. The guide to use of the charts is concise and well written. The species list preceding the charts is a handy addition, though it might more logically have followed the charts, providing information on a species after identification.

Like the Kansas guide, the booklet is not continuously paginated. This, plus a brief table of contents to major sections would add materially to its utility. The section references in the general vertebrate chart necessitate a good deal of undirected page flipping.

The introductory pages showed disappointingly little editorial attention. Hence, numerous errors of grammar and structure persist. J. C. Dickinson, Jr. appears at first glance to be one of the artists — sort of a drop from being museum director. A sentence in paragraph 3 of the section on reptile maintenance could easily be interpreted by novices as distinguishing crickets and mealworms from insects. Several punctuation marks are misused and others are missing. External fertilization of anurans is described, closely followed by the statement "Salamanders reproduce in a similar fashion. . ." Too bad about all those years wasted evolving spermatophores. Newts are described as possessing a " . . . thicker, warty skin . . .", though this only applies to the eft stage of *Notophthalmus* development.

Despite its shortcomings, which hopefully will be corrected in future printings, this booklet will be a worthwhile purchase for those novices desiring a quick identification reference to the Florida herpetofauna. It should prove similarly handy for class use in schools and nature camps. It is a good "stepping-stone" to more detailed herpetological references.

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INTRODUCTION TO HERPETOLOGY, 3rd EDITION, by Coleman J. Goin, Olive B. Goin and George R. Zug. 1978, 378 pages. $15.95. Witt, Freeman and Company, San Francisco.

This book shows considerable improvement its third time around. As stated in the preface, much reorganization is evident, especially in the chapters covering paleontology, reptilian reproduction, homeostasis, environmental relations, speciation and distribution. Many figures through the first half of the book are retained from the second edition but several have been redrawn to enhance clarity (notably 5-3 and 11-4 (the former 12-1)). A number of new figures enhance the clarity of the presentation, though most new ones mentioned in the publisher's literature are in the last third of the book (the taxonomic accounts).

The quality of the paper (glare white vs. off-white) and the lighter printing selected with this type font makes the third edition a more difficult volume to read than the second. Also, the chapter on reptilian reproduction would have been enhanced by the incorporation of Atlanta Zoo's very interesting documentation of elaborate parental care in Morelet's crocodiles. As it stands, the chapter retains sparce information (some of it conjectural) on the breeding habits of American alligators. The majority of the reference sections following chapters have been updated with well-selected new material, and offer the beginning herp student a good base from which to explore the content of most chapters further.

Chapter 12 begins the feature of this book which I had fervently hoped would be pitched from the new edition. Thirty-eight percent of the volume consists of taxonomic accounts of the living orders of herps, and presents capsule descriptions of taxa down to (in many cases) subfamilial level. Because of the necessary brevity of coverage, much of the taxonomic material takes on the nature of a trivia contest. The fact that *"Batrachuperus* differs from both *Hynobius* and *Pachypalaminus* in having the vomerine teeth separated into two small, isolated patches, rather than in a V-shaped series" is apt to be of little value or interest to a new student of herpetology using this introductory text. If this difference in dentition could be attributed to differences in feeding behavior, then *that* would be interesting, stimulating reading. Much interesting material on anatomy, physiology, general ecology and, especially, reproductive behavior of herps is entombed in this section (cost-wise, it amounts to a little more than $6.00 of the book's $15.95 price). I feel the book would be improved by retaining the taxonomic presentation as a simple table, including a new chapter covering major anatomical features unique to the living orders of herps, and redistributing the remaining material to appropriate chapters (expanding on some of the odder, more fascinating things which herps do). This last recommendation would serve to eliminate the dry, overly "clipped" appearance of a number of sections within chapters.

The book is generally free of typographical errors. I only noted two: on page 98, ovoviviparity is lacking the "t"; on page 113, the statement is made that Liebespeil precedes *courtship* instead of *copulation*. There are probably a few others, but they did not leap out at me and I was not attempting to sieve them all out. The index is generally satisfactory, though a few terms which a novice might hear and seek to identify are not listed; a thorough glossary might be a handy addition to future versions.

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THE BIOLOGY OF AN EQUATORIAL HERPETOFAUNA IN AMAZONIAN ECUADOR, By William E. Duellman. The University of Kansas Museum of Natural History Miscellaneous Publication, number 65, pp. 1-352, figures 1-198, tables 1-34, plates (in color) 1-4. $15.00 (paper).

Duellman's most recent major work represents the culmination of a decade of field work by the author and most of his stu-

dents in the upper Amazon Basin in eastern Ecuador. As in his earlier monographic studies, most of the taxonomic considerations were presented in short papers prior to the publication of the summary. A few taxonomic alterations are included in this work.

The publication consists of six 'chapters.' The first reports the scope and methods of the study as well as describes the study area (essentially the immediate environment of an airstrip then called Santa Cecilia), a site in the aseasonal rainforests just east of the Andes in northern Ecuador. Material is reported from five localities lying along the Rio Aguarico separated by a distance of some 120 kilometers.

The second 'chapter' provides keys to the identification of the 185 species making up the herpetofauna as well as keys to the known tadpoles. The keys are given in both English and Spanish. Their utility is enhanced by many drawings illustrating qualitative character-states. Further aid to identification is found in the 185 species accounts and the illustrations of individuals (photographs of 2 salamanders, 64 frogs, 22 lizards, 29 snakes and color paintings of 15 frogs, 6 lizards, and 8 snakes; 146 of the 185 species). Most of the photographs are of reasonable or high quality but several should probably not have been included because they are of lesser quality than most.

The third 'chapter' (187 pages of the text) is given to the 185 species accounts wherein are provided comparative paragraph(s) on identification, a statement on occurrence (ecological), life history data, food, and, where appropriate, descriptions of mating calls and tadpoles. A pleasant component of this chapter is the presence of four color plates (2 of frogs, one of anoles, and one of snakes) rendered by Linda Trueb, the competent editor of the volume.

The fourth 'chapter' reviews data on reproductive biologies of the herpetofauna. Frogs are discussed in considerable detail and Duellman's account largely readdresses material presented earlier by Crump (1974) and Salthe and Duellman (1973). Lizards and snakes are also treated at some length augmenting studies by Dixon and Soini (1975, 1976) and Fitch (1970). The paucity of information on caecilians, salamanders, turtles, and crocodilians reflects the interests, activity cycles, and collecting skills of Duellman and a generation of Kansas students as much as anything else.

The fifth 'chapter' addresses community structure. Duellman concludes that resources are not limiting and that niche overlap is high. The nature of his study and the competing demands of documenting the fauna relegated efforts to study community structure to a relatively low priority. Duellman notes these inadequacies but nonetheless attempts a series of analyses within the constraints of his biased data sets.

The last 'chapter' consists of a biogeographic summary for the herpetofauna. Duellman suggests that there are 8 distributional patterns exhibited by the 185 species. The evolution of the herpetofauna is presented within the frameworks of Haffer's (1969) and Savage's (1966, 1973) models.

The study is the most complete produced to date for any Neotropical herpetofauna. A similar study has not been produced for even Barro Colorado Island in Panama. The taxonomy employed is more or less up-to-date although Duellman's failure to use *Ololygon* for the *Hyla* of the *rubra* Group or to use *Vanzolinius* for *Leptodactylus discodactylus* (or to explain why he didn't use these) is inexplicable and vexing. The text is remarkably error free (I noted only a few trivial spelling errors). The only substantive error I caught is that Figure 56 is an excellent photograph of *Eleutherodactylus rubicundus* (Jiménez de la Espada), but not *E. diadematus* (Jiménez de la Espada). Neither species has been illustrated previously but *E. rubicundus* does not occur in the fauna Duellman reports. However, I suspect that this error is likely to bother only Duellman and me.

Duellman reports 185 species for the Santa Cecilia area (94 amphibians and 91 reptiles) but only 172 (86 amphibians and 86 reptiles) from the primary study site (Santa Cecilia). He confidently predicts that no more' . . . than ten additional species (mostly snakes) might be found in the area.' Such confidence is probably over-extended. Two caecilians, six frogs, two lizards, and three snakes included in the 185 species were not found at Santa Cecilia in 48 man months of fieldwork and one caecilian, three frogs, one turtle, three lizards, and eight snakes are each represented by single individuals from Santa Cecilia. These 29 species comprise a substantial percentage of the fauna. I would guess Duellman's underestimate is greater than 10 species, possibly on the order of 20 or 30 species.

Duellman's epilogue (a luxury always tolerated in so large a study) outlines how he would do the study could he start over. Certainly his experience warrants such suggestions but one wonders if the epilogue would not have been more appropriate in Spanish. A note of sadness for those of us who worked (however briefly) at Santa Cecilia is Duellman's closing paragraph —that the place from whence came these observations and 8000 + specimens is no more.

Most students of the Neotropics will find this study invaluable. Its reasonable price and quality recommend if for anyone interested in herpetology and/or a description of a piece of the severely pressed and rapidly vanishing *terra incognita*. Bill Duellman deserves our thanks for a job well done.

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DIETARY ADAPTATIONS IN ANIMALS by J. L. Cloudsley-Thompson. 1976. Meadowfield Press Ltd. (Dale Rd. Industrial Estate, Shildon, Co. Durham. DL4 2QZ, England). $7.00 (U.S.). 70 pp.

Part of the publisher's "Patterns of Progress" series, this booklet is based upon a similar chapter in Pergamon Press's **International Encyclopedia of Food and Nutrition** (1972). Removed from the context of the larger work, the booklet is something of a disappointment. To review in any meaningful fashion the dietary adaptations present in the entire animal kingdom in 70 illustrated pages means *a priori* that the work is going to be sketchy. This it is; too sketchy for research or graduate teaching use, too costly ($7.00 for one life function is a bit high) for undergraduate class use, and yet not exactly what one would seek for "light reading."

The references cited are adequate, though in the four years between the appearance of the parent chapter and the booklet, new material has appeared which should have been added. For example, beyond birds merely possessing a sense of smell (p. 2-36), this capacity is quite well developed in certain vulture species. Mucous-trap filter feeding (p. 2-8) is known in larval amphibians, and need not be a "primitive chordate feeding mechanism" as suggested.

Vampire bats are listed as "blood suckers" in several places, despite a correct description of their shave-and-lap behavior in the same section. This is disheartening. The photo of "*Crotalus atrox*" on page 2-35 is not *atrox* or even close to it (it might be *Crotalus cerastes*). Quality of printing is rather poor, and all-in-all I find little in this booklet to recommend it. If you find one in a garage sale for 25 cents and wish to spend about 3 hours surveying animal feeding, it would be a good purchase. But, not for $7.00. I am left wondering why the author, a very competent and respected zoologist, allowed the publisher to market this with his name on it.

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EARLY HERPETOLOGICAL STUDIES AND SURVEYS IN THE EASTERN UNITED STATES. Edited with an introduction by Kraig Adler. 1978. Arno Press, New York. A facsimile reprint of 18 studies. Pagination indeterminate (**ca.** one inch thick). $40.00.

For herpetologists who have spent years (even decades) searching musty used-book stores for the early literature on North American amphibians and reptiles, and who have watched the prices of these works spiral so high as to exceed the recent increase in energy costs, this tidy volume is a welcome treasure. Adler has carefully compiled an interesting and useful array of studies and surveys by eighteen naturalists whose early observations formed an invaluable record of biological exploration of our nation during the eighteenth and nineteenth centuries.

As in any compilation by different authors on diverse topics, this book is a conglomeration. The four papers by Richard Harlan represent a useful unit for quick reference to his most important works, but the reader will need a good memory to recall each of the other authors contained therein, and may neglect to consult this volume as a main source for them. This, however, in no way negates the simple value of having these works now available at a reasonable price. The inclusion of Hans Sloane's fanciful 1734 work on rattlesnakes is of dubious value to biologists, but provides some levity as well as a view of eighteenth century prose. I find the lack of overall sequential pagination annoying since it requires a bit of searching for a specific author. This, unfortunately, seems to be the trend with facsimiles of collected works.

I am pleased that Arno Press has undertaken such an ambitious facsimile program, and I feel this represents a good contribution in such a series. For North American herpetologists, it is a necessary addition to their library.

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LEGISLATION

LEGISLATIVE ALERT

FINAL Rulemaking:

a) from *Federal Register*, Vol. 44, No. 75, 17 April 1979, page 23062: The U.S.F. & W. Service has determined that the Bolson tortoise (*Gopherus flavomarginatus*) is an *Endangered* species. This rulemaking became effective 17 May 1979.

b) from *Federal Register*, Vol. 44, No. 85, 1 May 1979, page 25483: The following reptiles have received status changes on the CITES Appendices:
Gopherus flavomarginatus Bolson tortoise—change to Appendix I
Alligator mississippiensis American alligator—change to Appendix II
Crocodylus acutus (U.S. population) American crocodile—change to Appendix I
Crocodylus porosus (except saltwater crocodile, Papua, New Guinea population)—change to Appendix I
—effective 28 Jun 1979

PROPOSED Rulemaking:

a) from *Federal Register*, Vol. 44, No. 99, 21 May 1979, page 29566: The Endangered Species Act of 1973 (as amended) requires the U.S. Fish and Wildlife Service to conduct a status review of all listed species at least once every five years. Fish and Wildlife is requesting comments and appropriate data from any party which could potentially alter the status for the selected species of endangered or threatened wildlife. Deadline for comments: 20 August 1979.
Send to: Director, Fish and Wildlife Service
Federal Wildlife Permit Office
Washington, D.C. 20240

b) from *Federal Register*, Vol. 44, No. 101, 23 May 1979, page 30044; The Fish and Wildlife Service proposes to grant general permission to the public to take, engage in interstate and foreign commerce, and conduct certain other prohibited activities with captive-bred Endangered and Threatened species. Such permission would be limited to activities conducted to enhance the propogation or survival of the affected species. It also would be limited to exotic species and those native species that are sufficiently protected in the wild. Persons operating under these rules would be required to register and report on activities to the Fish and Wildlife Service so that a necessary minimum level of control can be maintained. Deadline for comments: 23 July 1979.
Send to: Director, Fish and Wildlife Service
Federal Wildlife Permit Office
Washington, D.C. 20240

c) from *Federal Register*, Vol. 44, No. 106, 31 May 1979, page 31534: The Endangered Species Scientific Authority (ESSA) is seeking public comment in order to determine whether commercial export of American alligator hides harvested after June 28, 1979 will not be detrimental to the survival of the alligator or other crocodilian species. Federal export permits could be issued only for hides that were harvested in Louisiana and Florida subject to specified conditions. Deadline for comments: 30 July 1979.
Send to: Executive Secretary, ESSA
18th and C Streets, NW
Washington, D.C. 20240

d) from *Federal Register*, Vol. 44, No. 112, 8 June 1979, page 33127: These regulations describe the functions and procedures of Endangered Species review boards and the Endangered Species Committee under the Endangered Species Act of 1973 (as amended), 16 U.S.C. 1531 *et seq*. These rules cover the exemption application processing period from the appointment of a review board to the final committee's determination. Deadline for comments: 4 September 1979.
Send to: Chairman, Endangered Species Committee
c/o Office of Policy Analysis
Department of the Interior
18th and C Streets, NW
Washington, D.C. 20240

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LIZARDS, LAWS, AND LITIGATION

One of the most frustrating problems facing herpetologists, as well as other biologists today, is the profusion of state, federal, and international regulations concerning the collection, transportation, exportation, and importation of plants and animals. Many of us, either intentionally or unintentionally, have acquired material illegally, and some of us have faced litigation.

In 1975 I imported seven specimens of non-endangered lizards into the United States without proper permits. In May 1978, agents from the U.S. Fish and Wildlife Service, acting on an "anonymous tip," approached me about the specimens. A deposition was taken, and the specimens were seized. Shortly thereafter I obtained *ex post facto* permission from the country of export (Ecuador). In October 1978 I was informed that I had violated the Lacey Act and was assessed a civil penalty of $100. This was paid, and the proceedings were terminated. Throughout the proceedings I cooperated fully with the personnel of the U.S. Fish and Wildlife Service, who were courteous and efficient.

The days of the casual collecting trip are over. Collection and acquistion of specimens must be planned for well in advance (applications for collecting permits for some countries must be submitted six months prior to the initiation of field work). Probably the most frustrating aspect of obtaining necessary permits is the inevitable delays and bureaucratic red tape; fortunately, in many foreign countries, sympathetic colleagues or government officials can and will expedite the issuance of permits. Many so-called third world countries are becoming increasingly aware of their natural resources and are taking steps to establish research collections. It behooves the scientific collector to work with scientists and agencies in these countries by depositing parts of their collections there, assisting in the proper identification of specimens, exchanging specimens for study, and providing needed literature. Such cooperation

on a personal basis is the first step in the implementation of realistic scientific affiliation that can benefit our science.

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HOUSTON TOAD RECOVERY TEAM MEETS IN HOUSTON

The first meeting of the Houston Toad Recovery Team was held in Houston, Texas on January 18 and 19, 1979. The Team was appointed in 1978 by Lynn A. Greenwalt, Director of the U.S. Fish and Wildlife Service. Members include: Floyd E. Potter, Leader, Texas Parks and Wildlife Department; Lauren E. Brown, Illinois State University; William L. McClure, Texas Department of Highways and Public Transportation; Norman J. Scott, National Fish and Wildlife Laboratory, University of New Mexico; and Robert A. Thomas, Louisiana Nature Center. One of the major responsibilites of the Team is the development of a Recovery Plan for the endangered Houston toad (*Bufo houstonensis*). Since the early 1950's, the expansion of the city of Houston was one of the important factors which resulted in the near-extinction of this species. In 1977, Critical Habitat was suggested for the species in natural areas in and around the city of Houston. National press and television coverage was given to the stiff opposition to these plans by the construction industry, businesses, and land developers. Consequently, the Houston toad has become well-known as a symbol of the plight of endangered species suffering from the expansion of cities.

The Team visited the type locality of the species and surrounding areas to observe the devastating habitat destruction which has occurred in recent years. A possible refuge was also inspected. The Team heard reports given by Barry Hinderstein (Texas Southern Univer-sity) on the current status of the Houston toad in Harris County, and by Hugh Quinn (Houston Zoo) on the rearing of Houston toads in captivity. James E. Johnson (U.S. Fish and Wildlife Service) led a discussion on the duties of the Recovery Team, the legal and political ramifications of the assignment of Critical Habitat in Harris County, and the format for the Recovery Plan. After the meeting was adjourned, the Team visited the Houston Zoo to observe the propagation and rearing facilities that have been developed for the Houston toad. The next meeting will be scheduled for sometime in the spring.

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INTERIM REPORT ON THE COMPILATION OF A STANDARD LIST OF COMMON NAMES FOR A FIELD GUIDE TO MEXICAN AMPHIBIANS AND REPTILES: NAMING CRITERIA

Within the last few years, plans on our part to produce a field guide to the amphibians and reptiles of Mexico have congealed. As a basic step towards the completion of that goal, we were faced with developing a set of common names for these animals as such a complete list does not now exist. To this end, during January of 1979 one of us (LDW) generated and mailed to colleagues who had worked in Mexico a multi-page form upon which could be inserted suggested common names. The development and dispersal of this form constituted Phase 1 of this project. Phase 2 involves the development of a set of naming criteria to be used in developing common names for Mexican amphibians and reptiles and is represented by the present paper. Phase 3 will involve the collation of information derived from responses to the Phase 1 activity and development of a preliminary list of common names consistent with the criteria detailed below. Phase 4 will consist of the submission of selected portions of the resulting list to various specialists for final comment prior to publication of the list. Finally, Phase 5 will involve submission of the completed list of common names for Mexican amphibians and reptiles for publication.

First of all, we would like to extend our sincere gratitude to those colleagues who took the time to respond to our initial request for input on our proposed *List of Common Names for Mexican Amphibians and Reptiles*. As we expected, the comments made in response to our request were varied. But with the help of these suggestions and, as well, benefiting from the leadership provided by the SSAR Committee on Common and Scientific Names and from the criticisms of the *Standard Common and Current Scientific Names for North American Amphibians and Reptiles* that followed in the pages of Herpetological Review (Vol. 9, No. 4 and Vol. 10, No. 1), we have tried to establish some ground rules for the standardization of methods for naming these animals. There are no unanimous opinions expressed among those responses we received as to the methods to be used nor, for that matter, the value of compiling this list. There will be, therefore, many who will disagree with one part or another of the results. This disagreement cannot be avoided. We only hope that our efforts will be of use to some and that others will understand the inherent difficulties of trying to please everyone.

Among the diversity of opinions expressed, one point was raised more often than any other (although it was not a majority viewpoint)—that of the desirability of the use of Spanish common names where appropriate. Some of the comments about our suggestion to use only English common names were: "It is their country and their animals;" and ". . . it smacks of gringoism." It should be understood that we mean no insult to Spanish-speaking people in general or Mexicans in particular. Those who know us well are cognizant that we all have had a long-term commitment to the people of Mexico and other countries in Latin America and a long-term interest in the amphibians and reptiles that occur within the boundaries of their country(ies). We originally considered using Spanish common names but dismissed the idea since our field guide will be written in English and there is adequate precedent in the Field Guide to Mexican Birds by Roger Tory Peterson and Edward L. Chalif. English common names are also used for European species in the recent Field Guide to the Reptiles and Amphibians of Britain and Europe by E. N. Arnold and J. A. Burton. For example, "Midwife Toad" is used instead of the German "Geburtshelferkrote" for *Alytes obstetricans*, and "Grass Snake" is used instead of the French "Couleuvre a Collier" for *Natrix natrix*. We feel that it would be just as inappropriate to use the Spanish common name "Escorpion" for *Heloderma horridum* as it would be to use the colloquial name "Scorpion" for *Eumeces laticeps* or "Stinging Snake" or "Hoop Snake" for *Farancia abacura*. Such usage would only promote misunderstanding. Furthermore, *Heloderma horridum* has had the name "Mexican Beaded Lizard" applied in earlier publications.

Another point frequently mentioned among the responses we received concerned the justification of the need for a list of common names. We sympathize with those who do not advocate the use of common names and do not ourselves suggest that common name usage be promoted as an alternative to using scientific names. We do feel compelled to provide, however, a list for those who feel more comfortable with such names, even though these names have no official status. Furthermore, the need is justified in order to:

1) be consistent with other field guides;
2) provide nontechnical people with names less intimidating than latinized scientific names; and
3) satisfy the requirements of listing common names on Federal Wildlife Import Declarations.

In an attempt to create a sense of order and uniformity of procedure to be used in assembling the final list, we have compiled the following GUIDELINES FOR CONSTRUCTION OF COMMON NAMES OF MEXICAN AMPHIBIANS AND REPTILES.

1) For species occurring both in the United States and Mexico, common names will be

used that appear in the "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" (1978, SSAR Misc. Publ., Herp. Circular No. 7). For species excluded from the above list, the names in either Stebbins' (1966) or Conant's (1975) field guides will be used.

2) Common names proposed by authors of SSAR catalogue accounts, monographs, or other publications will be used insofar as is possible.
3) Common names developed anew will be as short and easily pronouncible as possible.
4) English common names (translated from the Spanish, where appropriate) will be used, except where the Spanish name has become part of the English language, as for example, "Axolotl."
5) Common names will use descriptive or geographic terms more often than patronyms. Ambiguous terms, such as "Peninsula," will be avoided. Instead, "Baja X" or "Yucatan Y" will be used for those species found principally on these peninsulas, where appropriate. Insular forms will be named for the island upon which they occur and, likewise, where appropriate, for the mountain range, plateau, valley, desert and so forth upon or in which they occur.
6) Hyphens and -ed endings will be avoided, except for plural descriptive terms, such as twin-spotted, cross-banded, red-eyed, blotched, spotted, speckled, and so forth.
7) Common names for genera will be that of the type species.
8) Common names for subspecies will tend to be descriptive or geographic.

The purpose of this note is to publicize the criteria we will employ in attempting to standardize common names for Mexican amphibians and reptiles. Therefore, we invite any and all comments from the herpetological community at large as we engage in this arduous task. Finally, we want to say that we are quite pleased about the enthusiasm exhibited and the support offered for this project and the field guide.

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Editor's Note: Please direct any correspondence to the authors directly. *Herp. Review* will not publish comments on proposed criteria, and the editor does not wish to play post office.

Geographic Distribution

CAUDATA

AMBYSTOMA ANNULATUM (Ringed Salamander). USA. MISSOURI: Ozark Co.: along Mo. Hwy. 5 from Pontiac to 10 km NE. 21 Sept. 1977. Dennis and Maryann Harter. Verified by R. S. Funk. Many observed; two collected (R. S. Funk 3674-5). Extends known range due east from nearest record in adjacent Taney Co. (Johnson, 1977, Univ. Kansas Mus. Nat. Hist. Public Educ. Ser. No. 6:26).

Submitted by RICHARD S. FUNK, Department of Biological Sciences, Illinois State University, Normal, Illinois 61761.

AMBYSTOMA JEFFERSONIANUM (Jefferson Salamander). USA. MARYLAND: Garrett Co.: 1.5 km SSE Finzel. 26 May 1977. 2.0 km WNW Avilton. 8 June 1977. 7.2 km W Lonaconing. 15 April 1978. 4.3 km SE Swanton. 6 May 1978. 4.5 km E Swanton. 12 June 1978. E. L. Thompson. Verified by E. L. Thompson and J. E. Gates. Appalachian Environmental Laboratory, AEL 121, AEL 125, AEL 129. These 5 distribution records confirm the presence of the species in this westernmost county and extend its range well onto the Allegheny Plateau up to 829 m above sea level on and just west of the ridge formed by Big Savage and Backbone mountains (Harris, 1975, Bull. Maryland Herp. Soc., 11:89). Funds for this survey were provided by the Maryland Department of Natural Resources. This note is Contribution No. 931-AEL.

Submitted by EDWARD L. THOMPSON and J. EDWARD GATES, University of Maryland, Center for Environmental and Estuarine Studies, Appalachian Environmental Laboratory, Frostburg State College Campus, Gunter Hall, Frostburg, Maryland 21532.

ANURA

BUFO LINDNERI Mertens. AFRICA, TANZANIA, Coast Region, Kisarawe District, on grounds of Minaki Secondary School, 23 km SW Dar es Salaam. 28 April 1976. K. M. Howell, S. Tjomlid. Specimen identified by Miss A. G. C. Grandison and deposited in British Museum (Natural History), BMNH 1978.612. Common on dirt road at edge of lowland coastal forest after heavy rain. The species was previously known only from two specimens, a male and female collected at Dar es Salaam (Loveridge, 1957, Bull. Mus. Comp. Zool. 117(2):312). An additional specimen, BMNH 1978.611 has since been collected by W. B. Rudman on the University of Dar es Salaam main campus, 20 September 1976 at the edge of secondary vegetation.

Submitted by K. M. HOWELL, Box 35064, Department of Zoology, University of Dar es Salaam, Dar es Salaam, Tanzania.

BUFO MICRANOTIS RONDOENSIS Loveridge. AFRICA, TANZANIA, Coast Region, Kisarawe District, Pugu forest, app. 23 km SW Dar es Salaam, 29 October 1977. K. M. Howell and A. M. Mutani. Specimen identified by Miss A. G. C. Grandison and deposited in the British Museum (Natural History), BMNH 1978.613. Found in moist leaf litter outside the entrance to an abandoned kaolin mine in lowland coastal forest. The species was previously known only from Nchingidi, Rondo Plateau, mainland Tanzania, 360 km south of present record, and Jangombe Swamp, Zanzibar Island, 80 km northeast of present record (Loveridge, 1957, Bull. Mus. Comp. Zool. 117(2):313).

Submitted by K. M. HOWELL, Box 35064, Department of Zoology, University of Dar es Salaam, Dar es Salaam, Tanzania.

ELEUTHERODACTYLUS COCHRANAE (Whistling *Eleutherodactylus*; Coqui Pitito) Puerto Rico, USA. Culebra Island: about 2 km NE Dewey. 17 Feb. 1979. Coll. Herpetology class (J. A. Rivero). UPR-M 5138. Several specimens heard but only one collected; in bromeliads (*Tillandsia*) high in trees in xerophytic forest. The only other native *Eleutherodactylus* known from Culebra is *E. antillensis* (one specimen known), but *Leptodactylus albilabris*, *Bufo marinus* and *E. coqui* also present, the latter two imported recently. Previously known from Saint Thomas and Puerto Rico but not from Culebra (Grant, 1931. J. Dept. Agric., P.R. 16(3):215; Rivero, 1978. The Amphibians and Reptiles of Puerto Rico. Ed. Univ., Univ. de Puerto Rico, 13).

Submitted by JUAN A. RIVERO and RAFAEL JOGLAR, Biology Department, University of Puerto Rico, Mayaguez, P. R. 00708.

GASTROPHRYNE OLIVACEA (Great Plains Narrowmouth Toad). USA: OKLAHOMA: Cimarron Co.: Black Mesa State Park. 26 May 1979. C. Stammler, J. Tollefson, H. Guarisco. Verified by W. E. Duellman. Mus. Nat. Hist., Univ. Kansas, Lawrence, KU 181594-181597. Extension of *ca.* 250 km W of previously defined distributional limits (Nelson, 1972, Cat. Amer. Amph. Rept. 122.1-122.4) in the northern portion of its range, and indicates its probable discovery in adjacent New Mexico. All four specimens were found by day beneath rocks on hillsides around a man-made state lake.

Submitted by JOSEPH T. COLLINS, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045.

TESTUDINES

CHRYSEMYS CONCINNA (River Cooter). USA. TENNESSEE: Claiborne Co.: ca. 7 km SE Tazewell (in Sycamore Embayment of Norris Lake during high water). 13 June 1975. M.A. Ewert. Univ. Utah, UU 14278. A baby. Range extension of 350 km NE into eastern Tennessee from the nearest locality record, Marion Co., TN (Iverson, 1978, Herp. Rev. 9(1):22).

Submitted by MICHAEL A. EWERT, Department of Biology, Indiana University, Bloomington, Indiana 47401.

CHRYSEMYS PICTA BELLI X ***MARGINATA*** (Painted Turtle) USA. MISSOURI: Washington Co.: 21 km SE Sullivan (Indian Creek drainage). 2 June 1976. M.A. Ewert. Carnegie Mus., CM 65580. Hatchling from oviducal egg of female uncataloged at CM. This locality is ca. 70 km W of nearest record, Randolph Co.,

IL (Smith, 1961, Illinois Natur. Hist. Survey Bull. 28(1)). Extends range into Missouri Ozarks and Meramec River Basin. On the basis of four adults and 11 hatchlings I judge that the form is most nearly *C. p. belli* with the major difference being the presence of red striping on the limbs in place of yellow or yellow and orange as in pure *belli*. The local population is quite small (5 specimens observed or collected along 4 mi of drainage system).

Submitted by MICHAEL A. EWERT, Department of Biology, Indiana University, Bloomington, Indiana 47401. ●

CHRYSEMYS SCRIPTA ELEGANS (Red-eared Slider). USA. INDIANA: Bartholomew Co.: 3 km SSW Azalia. 29 August 1975. M.A. Ewert. Carnegie Mus., CM 61494. A juvenile. INDIANA: Shelby Co.: 2 km NW Marietta. 7 June 1977. M.A. Ewert. Two photographs of a subadult female deposited at the Carnegie Museum. Extends range 75 km NNE along the East Fork White River and its main tributary, the Big Blue River (Minton, 1972, Amphibians and Reptiles of Indiana). Local populations appear small (3 oxbow systems have yielded 3-8 subadults to adults observed or collected) and are restricted to oxbow ponds.

Submitted by MICHAEL A. EWERT, Department of Biology, Indiana University, Bloomington, Indiana 47401. ●

DERMOCHELYS CORIACEA SCHLEGELI (Pacific Leatherback). USA. ALASKA: Near Cordova (Lat.60.34N., Long.145.38W.). *ca.* 1 September 1962. Specimen caught in seiner's net and killed. Verified by biologist/museum staff or Cordova Historical Society Museum. Specimen in CHSM collections. Weight: 272.4 kg., length: 175 cm. (Astrid Sandstrom, CHSM, pers. comm.). Near Craig (Lat. 55.28 N., Long. 133.03 W.). 21 August 1978. Specimen caught in seiner's net and killed. Verified by National Marine Fisheries Service personnel. Weight: 321.9 kg. (after organs removed), carapace length: 162.5 cm., carapace width: 100 cm. Temporarily deposited in regional offices of Marine Mammal Division, NMFS, Seattle, WA. with eventual deposition in the collections of Portland State University, Portland, Oregon (Mil Zahn, Marsha Schad, NMFS, pers. comm.). Additional sightings include a second Craig sighting on 21 August 1978 and a sighting near Myers Chuck (Lat. 55.44 N., Long. 132.11 W.) "recently" (Williamson, 1978, Alaska, Alaska Northwest Pub. Co., Anchorage (11):22). It is n ot known if these sightings represent turtles other than the dead Craig specimen. The Cordova specimen (Lat.60.34N.) and the recently killed Craig specimen (Lat. 55.28 N.) represent the first extant *D. c. schlegeli* specimens from the State of Alaska and the northernmost Pacific Ocean records to date (Hodge, 1976, Amphibians and Reptiles in Alaska, the Yukon and Northwest Territories, Alaska Northwest Pub. Co., Anchorage).

Submitted by ROBERT PARKER HODGE, c/o Tongass Historical Society Museum, P.O. Box 674, Ketchikan, Alaska 99901. ●

GRAPTEMYS PSEUDOGEOGRAPHICA OUACHITENSIS (Ouachita Map Turtle). USA. INDIANA: Jackson Co.: 4 km SSE Medora (oxbow, E. Fork White River). 13 May 1976 and 20 May 1977. M. A. Ewert. One of five adult females collected at this site. Same specimen mentioned in Ewert and Legler, 1978, Herpetologica 34:314-318. A hatchling from the female's eggs to be deposited at the Carnegie Museum. INDIANA: Bartholomew Co.: 2 km SSW Azalia (adjacent to main channel E. Fork White River). M. A. Ewert. Verified by R. C. Vogt. CM 65583. Establishes range in East Fork White River up to 140 km NE (st. line) from its confluence with the West Fork, where the species is known from recent records (J. O. Whitaker et al., 1977, Indiana Water Resources Research Center, Report of Investigations 8, Bloomington, IN) and other records (Minton, 1972, Amphibians and Reptiles of Indiana). The species is common up to Columbus, IN, above which the main branch of the East Fork (Driftwood & Big Blue R. reaches) changes abruptly from a sand and silt bottom to a gravel, stone and mud bottom, and *G. geographica* has been the only species of map turtle observed. INDIANA: Clark Co.: 8.7 km NE Jeffersonville, IN and 10.5 km NE the Falls of the Ohio. 7 May 1975. M. A. Ewert. Basking adult female studied at leisure from 40 m with spotting scope. Not captured. This record establishes the species in the McAlpine Pool of the Ohio River just above the Falls of the Ohio and about 140 km equidistant from the Franklin Co., IN record (above the Falls) and the Knox Co., IN record (below the Falls) (Minton, 1972, Amphibians and Reptiles of Indiana). Babcock (1977, Institute for Mining and Minerals Research IMMR 25-GR4-77, University of Kentucky) lists the species in the Ohio River up to Meade Co., KY, 80 km WSW, and below the Falls. All aforementioned new records are of *G. p. ouachitensis* c. f., Vogt (1974, Herp. Rev. 5(3):79).

Submitted by MICHAEL A. EWERT, Department of Biology, Indiana University, Bloomington, Indiana 47401. ●

TRIONYX MUTICUS MUTICUS (Midland Smooth Softshell). USA. INDIANA: Jackson Co.: 3 km SE Medora. 4 September 1975. M. A. Ewert. Carnegie Mus., CM 61502. A baby. INDIANA: Bartholomew Co.: 3 km SSW Azalia. 29 August 1975. M. A. Ewert. CM 61501, male. INDIANA: Shelby Co.: 2 km NW Marietta. 3 September 1975. M. A. Ewert. CM 61503, adult male. Establishes record of the species in the East Fork White River and its main tributary, the Big Blue River up to 150 km NE of their confluence with the West Fork White River, where the species is documented (Minton, 1972, Amphibians and Reptiles of Indiana). The species is common NE to Columbus, IN and rare at Marietta, where *T. spiniferus* is common. Adult females frequent seasonally flushed oxbow ponds and the main channel. Males are rare in oxbows, common in the main channel.

Submitted by MICHAEL A. EWERT, Department of Biology, Indiana University, Bloomington, Indiana 47401. ●

SAURIA

ANOLIS S. SAGREI (Cuban Brown Anole). USA. FLORIDA: Lee Co.: Sanibel Is., common along Periwinkle Way and Gulf Drive. 24-26 June 1977. D. Moll. Many individuals observed; several photographed, captured and released (none preserved). Locality is ca. 150 km S of Tampa-St. Petersburg populations (Oliver, Copeia 1950(1):55-56), and ca. 200 km W of populations in metropolitan Dade, Broward, and Palm Beach counties (King and Krakauer, 1966, Quart. J. Fla. Acad. Sci. 29(2):144-154). Levy Co.: Waccasassa Marina adjacent to Waccasassa Bay State Preserve, 6.1 rd. km (by Fla. Hwy. 326) SW of Gulf Hammock. 2 June 1978. R. S. Funk. Three observed (both sexes); one adult male preserved (R. S. Funk 3673). Residents noted that only one was observed here during 1977. This site is ca. 160 km SW of Saint Augustine population (Meylan, 1977, Herp. Review 8(2):39), and 137 km N of Tampa-St. Petersburg populations (Oliver, op. cit.). This report brings to four the number of known occurrences of this species on the Florida west coast and helps document the continued spread of this introduced species in Florida in association with man.

Submitted by RICHARD S. FUNK, Department of Biological Sciences, Illinois State University, Normal, Illinois 61761, and DON MOLL, Department of Life Sciences, Southwest Missouri State University, Springfield, Missouri 65802. ●

EUMECES ANTHRACINUS PLUVIALIS (Southern Coal Skink). USA. OKLAHOMA: Murray Co.: Chickasaw National Recreation Area, 2.5 km SE Sulpher. 5 April 1978. OBU Environmental Biology Class. Webster Nat. Hist. Mus. 228-78. First record for the county and extends range 26 km W of nearest known locality in Johnston County. (Webb, 1970, Reptiles of Oklahoma, U. Oklahoma Press).

Submitted by JEFFREY H. BLACK and MICHAEL BUTCHER, Webster Natural History Museum and Department of Biology, Oklahoma Baptist University, Shawnee, Oklahoma 74801; E. MACDOUGALL PALMER, Rock Creek Nature Center, 5200 Glover Road, NW, Washington, D.C. 20015. ●

HEMIDACTYLUS GARNOTI (Indo-Pacific Gecko). USA. FLORIDA: Brevard Co.: Floridana Beach, SR A1A. 22 April, 13 May 1978. S. Myers and W. Hutchinson. FSM/UF 43749-43751. New county record. Floridana Beach record lies 28.1 km North of Wabasso Beach record (Myers, S. 1978. SSAR Herp. Review 9(3):107). Geckos were found on a building which was formerly an exotic plant outlet. This record represents the northern most recorded locality. St. Lucie Co.: Ft. Pierce. 30 April, 17 May 1978. S. Myers and S. Phillips. FSM/UF 43752-43754. New county record. Locality lies 42.2 km south of Wabasso Beach record (Myers, S. 1978. SSAR Herp. Review 9(3):107) and 43 km north of the Hobe Sound record (Myers, S. 1978. SSAR Herp. Review 9(3):107).

Submitted by STEVEN MYERS, Department of Herpetology, Fort Worth Zoological Park, Fort Worth, Texas 76110.

SERPENTES

LAMPROPELTIS TRIANGULUM ELAPSOIDES (Scarlet kingsnake). USA. SOUTH CAROLINA: Oconee Co.: 1.1 km E county rd. #171 (Whitewater Falls Rd.), 14.5 km N Salem, 610 m elevation. 26 June 1977. Carl Putnam. Verified by D. W. Herman, Atlanta Zoological Park, in private collection of D. W. Herman #094. First record for county and northwestern South Carolina. Nearest recorded specimens for the upper Savannah River drainage (Chattooga-Tugaloo-Savannah River systems) were reported in Rabun County and Habersham County, Georgia by Neill (1949, Herpetologica 5:8) and Herman (1977, Bull. Ga. Herp. Soc. 3(2):4-9) and Macon County, North Carolina by Williams (1978, Milwaukee Pub. Mus. Publ. 2:1-258).

Submitted by DENNIS W. HERMAN, Atlanta Zoological Park, 800 Cherokee Ave., SE, Atlanta, Ga. 30315 and CARL PUTNAM, Rt. 5 Box 37P, Anderson, S.C. 29623.

THAMNOPHIS SAURITUS SACKENI (Peninsula Ribbon Snake). USA. FLORIDA: Monroe Co., Key Largo, 11.3 km NE junc. US Hwy 1 and State Hwy 905. 3 January 1979. P. E. Moler. Fla. State Mus., UF-43827. Male. First record from upper Florida Keys. (Duellman, William E. and Albert Schwartz. 1958. Bull. Fla. State Mus. 3(5):181-324; Paulson, D. R. 1966. Quart. J. Fla. Acad. Sci. 29(4):295-308; Rossman, Douglas A. 1970. Cat. Amer. Amph. Rept., 99.1).

Submitted by PAUL E. MOLER, Wildlife Research Laboratory, Florida Game and Fresh Water Commission, 4005 S. Main Street, Gainesville, Florida 32601.

TROPIDOCLONION LINEATUM TEXANUM (Texas Lined Snake). USA. TEXAS: Duval Co., 8.0 km W, 11.2 km N Freer. 15 May 1978. G. E. Benefield. Verified by W. Seifert. Dallas Mus. of Nat. Hist., DMNH 4946. First record for county. Extends known range two counties southward and represents the southernmost locality for *Tropidoclonion* (Raun and Gehlbach, 1972, *Amphibians and Reptiles in Texas*, Dallas Mus. Nat. Hist. Bull. No. 2; W. Seifert, pers. comm.).

Submitted by GERALD E. BENEFIELD, Tulsa Zoological Park, 5701 E. 36th St. N., Tulsa, Oklahoma 74112.

VIRGINIA STRIATULA (Rough Earth Snake). USA. OKLAHOMA: Okfuskee Co.: Weleetka. 3 April 1977. David W. Lollis. Webster Nat. Hist. Mus. 189-77. First record for county on western edge of Oklahoma range (Webb, 1970, Reptiles of Oklahoma, U. Oklahoma Press).

Submitted by JEFFREY H. BLACK and DAVID W. LOLLIS, Webster Natural History Museum and Department of Biology, Oklahoma Baptist University, Shawnee, Oklahoma 74801.

RANGE EXTENSION OF THE SNAKE, *SIBON ANTHRACOPS* (COPE), IN EL SALVADOR

The range of *Sibon anthracops* (Cope) is poorly known. Peters (1960) defined it as the Pacific slopes of Costa Rica and Nicaragua and Peters and Orejas-Miranda (1970) also included Pacific Honduras. Recently, Meyer and Wilson (1971) have reported the first record for this species on the Caribbean versant of Honduras.

On the night of 2 July 1978, I collected a specimen of *Sibon anthracops* (Cope) at 575 m, 3 km E Tenancingo, Depto. Cuscatlán of central El Salvador; the snake was at 2.60 m in a tree (*Randia* sp) in an area that originally was Subtropical Moist Forest Formation (Holdridge, 1975). Presently there are only thickets, cropfields and pasture. This constitutes the first Salvadoran record, extending the known range of this species about 700 km west along the Pacific Slopes of Central America.

The specimen from El Salvador (HH 106, in my private collection) is a female and has the following characteristics: nasal divided; loreal enters orbit; no preoculars; two postoculars; temporals, 1 + 2; supralabials, 7 - 6, with the 4th and 5th entering orbit on the right side, and the 3rd and 4th entering on the left; both 6th supralabial on the right side, and 5th on the left, greatly enlarged, in contact with postoculars, primary and secondary temporals; infralabials, 7 - 6, a groove between first pair of chin shields; dorsal scale formula, 13 -13 - 13, all dorsal scales smooth; vertebral scale row not enlarged; ventrals, 170; anal plate entire; subcaudals, 74, in two rows; caudodorsal scale reduction formula:

$$\frac{6}{2+3(9)}\ \frac{2+3(8)}{4}\ 2+2(18)\ \frac{3}{V+1(45)}\ \frac{V+1(44)}{1}\ V\ \frac{1(45)}{1(46)}\ \frac{2}{(74)}$$

Total length, 482 mm; body length, 357 mm; tail length, 125 mm.

The color in life was: dorsal ground color white; 17 black bands on body, narrowed on sides, meeting on venter; 8 black bands on tail, forming rings; scale rows 2 to 7 brick red between black body and tail bands, extending laterally to ventrals, becoming most pronounced posteriorly; venter white; head black, covering laterally three-fourths of the parietals, first supralabials, upper half of those entering orbit and postoculars; first white interspace includes posterior edges of parietals, temporal region and posterior supralabials and extending to second scale behind parietals; mental, first three infralabials and anterior half of first pair of chin shields black; rest of chin white.

I have not examined type material, however, my description agrees fairly well with those given by Peters (1960), and Meyer and Wilson (1971).

The distribution of *S. anthracops* (Cope), as presently recorded, is Honduras: Coyoles, Depto. Yoro (Meyer and Wilson, 1971); El Salvador: Tenancingo, Depto. Cuscatlán; Nicasan Salvador, El Salvador, C. A. Aguacate Mountains; San Antonio de Belén; Barranca (Peters, 1960) and Tenorio, Las Cañas, Guanacaste (Taylor, 1954).

ACKNOWLEDGEMENTS

I thank my cousin Miguel O. Escobar for the field assistance and Joseph C. Mitchell for his critical reading of the manuscript. I also thank Sra. Ana Margoth Cándido de Coto for typing this manuscript.

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HUGO HIDALGO
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OBSERVATIONS ON CHELONIA MYDAS MYDAS: A NORTHERLY EXTENSION OF KNOWN NESTING RANGE

Carr and Ingle (1959) documented the first nesting emergence of *Chelonia mydas mydas* on the North American Coast from hatchlings and photographs taken from Hutchinson Island, Martin County, Florida and Vero Beach, Indian River County, Florida. Additional records of *Chelonia mydas mydas* nesting activity on Hutchinson Island were reported by Routa (1967) and Gallagher *et al.* (1972). *Chelonia mydas mydas* was observed nesting on Merrit Island National Wildlife Refuge, Brevard County, Florida on July 3, 1973, approximately 5 km south of the Volusia County line, Florida (Eberhard 1975). This observation represented a northerly extension in nesting range of nearly 160 km.

On June 21, 1978, at Cape Canaveral National Seashore, Volusia County, Florida, a nesting female was observed approximately 2.5 km north of the Volusia County line. Over curvature carapace measurements were 126 cm in length and 114 cm in width. Maximum head width was 14 cm. Sixteen mm films were taken of nest construction, covering activity and beach descent. Monel and Jumbo Roto

Tags, CR1156 and FL0049, respectively, were attached to the front flippers. The same female was observed on July 14, 1978, renesting, approximately 16 km north of the Volusia County line. These observations appear to constitute the earliest and northern-most known records of *Chelonia mydas mydas* in the western hemisphere.

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ERRATA FOR HR 10(2)

Page 52, col. 3, para. 2, line 32: "of" should read "or." Page 60, col. 3, para. 3, line 1: "mutabil-is" should read "mutabilis."

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SSAR ANNUAL MEETING NEWS

HERPETOLOGY AT THE UNIVERSITY OF TENNESSEE-KNOXVILLE

The University of Tennessee-Knoxville traces its ancestry back to 1794 when the Legislature of the Federal Territory granted a charter to Blount College two years before Tennessee achieved statehood. From the beginning, Blount College was nonsectarian and it was the first coeducational college in the United States. In 1807, the State Legislature changed the name of the institution to East Tennessee College and in 1840 it became East Tennessee University. Closed during the Civil War, the buildings of East Tennessee University served as a hospital for confederate troops and then for union soldiers. In 1869, soon after reopening, East Tennessee University was selected as a Land-Grant Institution and in 1879 became The University of Tennessee. In 1968 the Board of Trustees reorganized the institution into a State University system with the central campus at Knoxville. The present enrollment on the Knoxville campus is about 30,000, of which over 7,000 are professional or graduate students. There is a faculty of about 1300. Located on the Knoxville campus are, among others, a large College of Liberal Arts with departments of biochemistry, botany, microbiology and zoology and the Graduate Program in Ecology, the School of Architecture, and Colleges of Agriculture, Engineering, Law, Nursing and Veterinary Medicine. Close ties are maintained with Oak Ridge National Laboratory, about 20 miles west of Knoxville, through shared students and faculty. The University of Tennessee Graduate School of Biomedical Sciences is located in Oak Ridge. In addition, cooperative biological research is conducted with the National Park Service, National Forest Service and the Tennessee Valley Authority which has its headquarters in Knoxville.

The University of Tennessee-Knoxville has recently expanded opportunities for graduate studies in herpetology. Herpetological research is now being conducted under the auspices of the departments of psychology and zoology, and in the interdisciplinary Graduate Program in Ecology of the College of Liberal Arts. The latter program draws its shared faculty from various departments within the College of Liberal Arts, from the College of Agriculture, College of Engineering, Oak Ridge National Laboratory, National Park Service, and the Division of Forestry, Fisheries and Wildlife Development of the Tennessee Valley Authority. Although Tennessee occupies a critical zoogeographic position, the state is relatively poorly known herpetologically and opportunities for local behavioral, ecological and systematic studies are excellent. Field research in the immediate area is possible on the Cumberland Plateau to the west and in the Appalachian Mountains to the east. The Great Smoky Mountains National Park is but 40 miles south of Knoxville and other equally convenient natural areas include Catoosa Wildlife Management Area, Cherokee National Forest and a number of state parks and forests. The University of Tennessee maintains a state-wide network of agricultural field stations which are available for research purposes. Behavioral studies are encouraged at the newly redesigned reptile facility at the Knoxville Zoo and plans are being developed for a separately housed reptilian ethology laboratory there.

Three faculty members are directly involved in herpetological research. Dr. Gordon Burghardt (Department of Psychology and Graduate Program in Ecology) continues his long-term studies of green iguana behavior and ecology at Barro Colorado Island in Panama. This project, in collaboration with Dr. A. Stanley Rand, has involved several graduate students over the years. He is also continuing his investigations of the tongue-vomeronasal system of snakes and lizards utilizing electrophysiological techniques including EMG recording from the tongue muscles. These methods will be utilized in a comparative study of Natricine snakes. Chemical analysis of prey attack releasing substances is under way. An ontogenetic perspective underlies all aspects of Burghardt's studies.

Six graduate students are presently studying reptilian behavior under Burghardt's direction. Bryan Bock has initiated studies of caudal luring and predation in pit vipers. Marilla Davis is conducting field and laboratory studies of sociality of the eastern box turtle, *Terrapene c. carolina*. Beverly Dugan has been heavily involved in the Barro Colorado studies and her dissertation topic is social behavior of the green iguana (*Iguana iguana*). In addition, she has been studying interactions between nesting crocodiles (*Crocodylus acutus*) and nesting iguanas on Slothia Island near Barro Colorado, a pre-hatch mortality in green iguanas. Hugh Drummond's dissertation research is on amphibious predation by



AYRES HALL — The University of Tennessee, Knoxville was one of the earliest universities established on America's first frontier. It was founded in 1794, just 18 years after America declared its independence. Ayres Hall, built in 1919, has come to represent the University's mission of education for thousands of students. Photograph courtesy of the Office of Public Relations, University of Tennesse, Knoxville 37916.

garter snakes and involves a comparative field and laboratory behavioral study of predatory techniques. Drummond has three other ongoing projects: Orientation of migration by hatchling green iguanas, luring in newborn alligator snapping turtles (*Macroclemys temmincki*) (description and experimental analysis), and stimulus control of amphibious predation in northern water snakes (*Nerodia sipedon*). Roy Scudder is studying behavioral and biochemical relationships in the genus *Nerodia* using scent gland secretion lipids. Paul Weldon has a general interest in chemical communication and chemical recognition of predators and is studying chemical recognition of predatory snakes and snake skin chemistry. Dr. Doris Gove recently completed her dissertation under Burghardt's direction (The form, variation, and evolution of tongue-flicking in reptiles) and is a Visiting Assistant Professor in the Department of Psychology. Another recent Burghardt student, Dr. Harry Greene (Dissertation title: Phylogeny, convergence, and snake behavior) is presently an Assistant Professor in the Department of Zoology at the University of California at Berkeley.

Dr. Arthur C. Echternacht (Department of Zoology and Graduate Program in Ecology) joined the UTK faculty in 1975. He is continuing systematic studies of South American lizards of the genus *Ameiva* and has initiated a comparative ecological study of melanistic and non-melanistic *Ameiva* on small islands in the West Indies. He and several students are studying aspects of the ecology of *Anolis carolinensis* at the northern edge of its range at a locality near Knoxville. In collaboration with William H. Redmond, he is beginning work on a field guide to the amphibians and reptiles of Tennessee.

Six graduate students are working with Dr. Echternacht. James L. Jenkins, in a study of the energetics of optimal diet, is investigating the prey size-distance relationship as a function of hunger in adult male *Anolis carolinensis*. Robert L. Jones recently completed a Master's thesis on resource partitioning among six species of plethodontid salamanders and is drawing up a dissertation research proposal on a related subject. He has been a critical and vocal participant in discussions of local herpetological issues. William H. Redmond is performing a quantitative analysis of the zoogeography of the amphibian fauna of Tennessee and is collaborating with Raymond Stone on s study of the distributions of *Hyla versicolor* and *H. shrysoscelis* in Tennessee. Julia Wade-Smith is conducting a comparative study of reproductive strategies of female *Anolis carolinensis* from Tennessee and Louisiana. Raymond Stone is studying resource utilization and habitat selection by *Anolis carolinensis* at the study site near Knoxville. James Thompson has initiated a taxonomic study of snakes belonging to the tribe Lampropeltini.

New to the faculty, Dr. Neil Greenberg (Department of Zoology and Graduate Program in Ecology) adds expertise in behavioral ecology and physiological ethology to the group. He is presently preparing an ethogram of *Anolis carolinensis* and continuing his studies of the olfactory projections in the central nervous system of *Anolis*. He is also studying forebrain control of social behavior and the neuro-endocrinology of social organization in lizards.

George A. Middendorf, working under the direction of Dr. Susan Riechert, a spider ecologist, is completing his dissertation on the energetic basis of social structure which is based on manipulative field studies of *Sceloporus jarrovi* in southeastern Arizona. He is also completing a study of thermoregulation and diel activity patterns of *Sceloporus jarrovi*, lizard responses to chemical cues of predators, and a zoogeographic analysis of the *Sceloporus torquatus* group.

An active research program is maintained by personnel of the Department of Herpetology at the Knoxville Zoological Park. Howard E. Lawler, Curator of Reptiles, is in charge of the newly renovated reptile complex. Projects in progress include studies of the natural history and reproductive dynamics of *Brachylophus fasciatus*, the influence of photoperiod variance on germ cell recrudescence in reptiles, natural history and reproduction in the tortoise genera *Pixys* and *Acinixys*, territorial scent marking by captive reptiles, nutritional value and growth potential for artificial diets in rearing juvenile boids, and the control of Ophidascaridae in a large collection of live reptiles. Collaborative research between visiting investigators and zoo staff are encouraged and plans are being made for a separately housed reptile ethology research facility on the zoo grounds. This is to be a cooperative project between the Knoxville Zoological Park at the University of Tennessee-Knoxville.

Communication within this diverse assemblage of herpetologists is fostered by a seminar series which is scheduled about twice a month to meet in the home of a faculty member. Students, faculty and outside speakers participate in an effort to keep all



UNIVERSITY OF TENNESSEE, KNOXVILLE CAMPUS

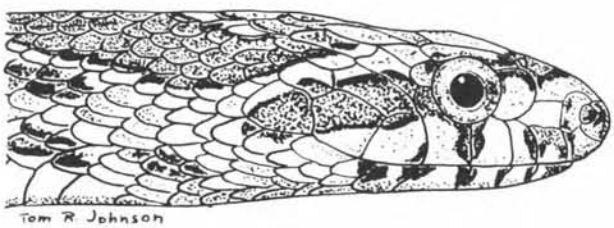
SCENIC SPOT — The area around the Humanities and Social Sciences Complex at the University of Tennessee, Knoxville, is one of the most scenic on the campus. In the center is McClung Tower, an office building for Liberal Arts faculty. At the right is the Volunteer statue, which symbolizes the spirit of the University. Photograph courtesy of the Office of Public Relations, University of Tennessee, Knoxville 37916.

informed of on-going herpetological research at UTK and elsewhere in, especially, the Knoxville area. Students (and faculty) are given the opportunity to present progress reports and give practice runs on papers to be presented at national meetings, final thesis or dissertation defenses and job interviews.

Beginning with the base of a small teaching collection in existence when Echternacht arrived at UTK in 1975, a concerted effort is being made to expand and upgrade the research collection of amphibians and reptiles maintained by the Department of Zoology. The emphasis of the collection is the southwestern United States and, especially, Tennessee. Additions have been made primarily in concert with the research projects of various graduate students and in collection of desmognathine salamanders is growing especially rapidly. We will soon have species and geographic files enabling us to communicate our holdings to interested investigators and facilitating loans. Inquiries are invited.

ARTHUR C. ECHTERNACHT, Department of Zoology, University of Tennessee, Knoxville, Tennessee 37916.

UNIVERSITY OF TENNESSEE, KNOXVILLE CAMPUS



SSAR BUSINESS

SSAR Treasurer's Report for 1978

INCOME	
Dues	$18,600.31
Subscriptions	8,379.50
Contributions	1,540.36
Publications Sales	12,000.88
Refunds	14.83
Reprint Sales and advertisements	7,137.15
Interest	3,762.80
SSAR Cat. Amer. Amph. Rept.	9,204.30
Balance in account 1 January 1978	59,213.78
TOTAL	$119,853.91

DISBURSEMENTS	
Journal of Herpetology	$22,316.65
Herpetological Review	6,896.14
Herpetological Review Index	1,671.36
Herpetological Circulars	1,251.50
Small Facsimile Reprints	1,931.33
Book Facsimile Reprints	2,792.94
Expenses of President	5.85
Expenses of Secretary	97.93
Expenses of Elector	501.26
Expenses of Treasurer	1,570.04
Expenses of Publications Secretary	2,152.84
Expenses of Asst. Publications Secretary	491.52
Annual Meeting	58.40
Current Literature Titles	225.70
Bank charges	117.14
Translations	100.00
ASC Dues	25.00
Zoological Record Contribution	100.00
Membership Lists	29.50
SSAR Cat. Amer. Amph. Rept.	4,420.00
TOTAL	$46,755.10
Balance as of 1 January 1979	$73,098.81

Henri C. Seibert
SSAR Treasurer
25 January 1979

EDWARD HARRISON TAYLOR, 1889-1978

SHIFTING SANDS

The passage of Edward H. Taylor in June, 1978, has been ably noted by his successor, W. E. Duellman (1978), at the Museum of Natural History, University of Kansas, where Taylor was active for 70 years. The KU Biological Sciences Newsletter also briefly reflected upon his transit (Leonard, 1978). Biographical and autobiographical material appeared a few years earlier in a special publication of the same museum (see Taylor et al., 1975). An obituary by one of Taylor's most steadily productive students, Robert G. Webb, has also just appeared (1978). Certainly other personal appraisals can be expected to appear in the future as inevitable after-effects of the shutdown of one of the most powerful sources of intellectual energy that ever existed in herpetology.

Although much of my own views of my former mentor is embodied in notes accompanying Taylor's reminiscences (*op cit.*, 1975), some things were left then unsaid, because he was still living, that can now be expressed.

In mentally reviewing my own life in the role of perhaps the best-known of Taylor's students, sharing a great deal of field work with him in Kansas and Mexico, preparing a master's and a doctoral dissertation under his direction, working jointly with him on more projects (exclusively Mexican) than anyone else, and producing a vast interchange of correspondence, the essentials that persist are the impressions resulting from the accumulation of experiences, not the experiences themselves. It is these impressions I am moved to record. The historical details, indeed, engender so little appeal that, when not long ago Ed placed his lifetime correspondence in the archives of the University of Kansas library, I asked that my letters be removed, for I was more concerned than he that oncoming generations be spared the soon-to-be-meaningless burden of the clutter of lifetime accumulations of only once-important verbal exchanges.

At the same time it is fitting, at the behest and with the cooperation of his former wife, that alter biographical information be recorded on his progeny. That contribution forms part II of this compendium.

I

Edward Harrison Taylor was not one person; he played many roles and led several lives: the captivating raconteur, the consummate actor, the indefatigable field

man, the consort of royalty, the social lion, the slave-driver, the work-horse, the poet and writer of literature, the marathon swimmer, the bridge-expert, the under-cover sleuth, world traveller, adventurer, teacher, naturalist, incorrigible iatrophobe. In all these roles he exhibited numerous constant attributes: distrust of others, independence, inscrutability, impatience, fathomless self-confidence, adulation of and hunger for power, monumental self-sufficiency, the need to control his own life and events about him, but of complete honesty, bent only by the necessities of courtesy, varying with degree of respect engendered in him. He could be amazingly diplomatic upon significant occasions, but brutally blunt at other times. Domineering and biased, he was a factor that could not be overlooked by anyone whose life he touched. The alchemy of his and other lives was seldom neutral; almost always either sparks flew, sometimes followed by growth of intense hatred, or admiration masked all other feelings, sometimes mutual but more often one-sided, and in the latter situation usually of him, not by him. In the rare latter situations, the admiration was of the elite — of royalty, of high-level politicians, of those who wielded power. There was a certain exclusivity in his associations, a class-consciousness and keen awareness of different kinds of class, as of intellectual, social, political, etc., and of the necessity of compartmentalization of associations with those classes.

Such a many-faceted, multi-talented person can scarcely be characterized adequately, for as in the parable of the blind men and the elephant, each observer comprehends but a part of the total picture. No one ever, I think, knew him really well, and few indeed could be considered truly close friends. So far as I could observe, the closest friend of his entire life was A. Byron Leonard, who shepherded him through his final years, and especially his last few months. Byron was a friend of very long-standing, from the years when he was a student early in Taylor's tenure as a professor at the University of Kansas. But there was nothing especially close about the friendship until the last few months of his life, when no longer was it possible to live without some dependence upon others.

This is not to say that others would not lavish upon him all the affection he would accept; it was merely a matter of going so far, and no farther, in his relations with others, no matter how adulatory they might be. He loved adulation, and responded nobly to it with a widely captivating charisma, but he was nevertheless careful to avoid any extreme that would leave him "beholden" to others. There was always a curtain of aloofness close behind any appearance of warmth.

Indeed, it has seemed to this observer that Ed was sometimes a bit cruel in not acknowledging and fully appreciating the abundant concern he received from his colleagues at the University of Kansas, especially in his retirement years. He was given every comfort and convenience, watched and protected with almost fanatic care, all accepted with casual recognition but with little overt evidence of gratitude. Yet his very existence for several years was due in large part to the unflagging attention of particularly W. E. Duellman.

Of course Ed's life was not rigidly the same throughout; there was an ontogenesis of personality inevitable in anyone who successfully weaves his way among the many hazards of life to protracted old age. No one knew him well throughout that time; they knew him as a struggling, undirected undergraduate student, or as a tireless worker in his youth in the Philippines, or in his prime as a famed herpetologist at the University of Kansas, or as a retired celebrity, or as a tired, gentle old man awaiting the Final Call. He was not the same person throughout these stages of his long, active life, and to see him only as he was at any one time ignores the complexity of the total picture.

The stage least known of all, to me and to others of his professional world, is his youth prior to departure for the Philippines — the undergraduate days at the University of Kansas (where he spent his entire post-secondary school life except for periods of foreign travel), and the years that preceded them. His lengthy stay in the Philippines is sketchily known, and very little is revealed of his activities in the war years and immediately thereafter, when he participated in missions to Russia (after World War I) and in southeastern Asia (during World War II). However, the scarcity of public information on the latter two episodes was a matter of design; Ed was always extremely secretive about his role in them, content to let others guess what they may have been. Indeed, he much disliked any effort at any time to "pry" into his past or into his plans for the future, and he became abusive when rare confidences about either were shared with others. Even the most innocent revelations, when they came home to him, were likely to evoke a seemingly quite disproportionate reaction. He wanted no "press-agent," as he often sharply characterized a surprised, indiscrete confidant, although he welcomed attention to professional accomplishments. It was his personal life of which he was so extremely protective, quite to the level of paranoia at times.

The only event relative to his World War II experiences in southeast Asia that I can remember he confided in me was the occasion when his boat (size not indicated) was sunk one night in the East Indies, making it necessary for every survivor to swim a long distance (several miles?) to the nearest shore. After a while, as they were swimming, one of his shipmates called for help, exhausted, and although Ed knew he would do well just to make it on his own, he chose not to let his companion drown alone, and went to his rescue. Even though a powerful swimmer, Ed had a very long distance to go carrying an essentially dead weight. Only by the narrowest margin did he manage to make it safely to shore, there to collapse in complete exhaustion. He claimed never to have fully recovered from the strain. A few years later he, by accident, encountered the man he rescued on a train trip, but received only a grudging nod of recognition. That incident is exemplary of the sort of gratitude he often received for the help often given without acknowledgment.

Not all of the recipients of his largesse were such ingrates, however. Claude W. Hibbard, a graduate student at KU when Taylor was a professor there, was one of Ed's most outspoken admirers as long as he lived, and it was a severely depressing blow to Ed when he died.

Ed was not particularly eager to collect graduate students however. The requests almost invariably came from the other direction, and frequently various reasons came to light that led to assignment to other advisers. It seemed that never were paper credentials involved; the prospects were accepted or rejected after they arrived in person.

Taylor's professional stature has received a great deal of acclaim, and properly so. His output was prodigious and largely devoid of trivia that so deceptively embellish the publication lists of many other luminaries in his field. His taxonomic insights are legendary, even though some have proved to be illusory. Nevertheless many others have withstood the tests of time and the endless probing of his colleagues. He was anything but conventional in his interpretations.

Therefore a giant indeed he was, in professional contexts, his marks far surpassing most others, certain to endure for untold generations through the printed pages of which he produced so many (over 9000). What will be forgotten so soon is his monumental personality, so elusive of preservation yet so unequalled. I doubt that a stronger personality in the field of herpetology ever existed, partly because I have observed or am otherwise aware of quite a few of the giants of the past (and present), and partly because I cannot conceive of a more pervasive aura of authority — sometimes benevolent, sometimes fearsomely malevolent — ceaselessly emanating from anyone. It was the same sort of power, I imagine, as that possessed by the most compelling political leaders the world has ever known — a sort of hypnotic spell always at his command, in any of numerous guises adapted to the situation at hand. Very seldom was he at a loss to exert control where he wished. Impressed though I am with the magnitude of his professional stature, anyone who knew him well recognized that the professional record was just one facet of a much greater giant — of the mysterious and unique giant of innumerable facets contributing to the incomparable and incomprehensible Edward Harrison Taylor.

It should be observed that the circumstances under which Taylor's many talents flowered were not particularly favorable, and certainly some were not developed to their potential because of that. Yet the extent of their development is a documentation of the axiom that the greater the talent, the less likelihood that circumstances could prevent it from expression, although they can minimize it, and conversely, that the more marginal the talent, the greater the likelihood that unfavorable circumstances could conceal it.

The stature that Taylor achieved is not widely recognized as multidimensional,

overshadowed as it is by the documented professional eminence that is so widely, and properly, recognized. Yet multidimensional it is, of amazing breadth and depth, unlike the stature of many whose claim to fame is essentially unidimensional and a product of either exceptional scope within that framework, or of exceptional refinement and depth of penetration. It is this breadth of genius that was so outstandingly unique in Taylor.

The sadness of his passing is thus not so much that his professional work was ended, for it had run its course, and remains to awe the world for generations to come. It was that this fleshly monument, so diversely talented, so complexly beyond ordinary comprehension, should be relegated to oblivion long before it could somehow be registered in permanent record, available for scrutiny and analysis until it could be understood in detail. For a time this unique masterpiece was ours; it escaped from us without leaving with us any of its irreplaceable secrets of structure — an opportunity lost, albeit an opportunity we are even yet far too ignorant to grasp no matter how intense the desire. Nevertheless an opportunity lost, that will not come our way again, and that leaves us so helplessly diminished — and, most lamentably, so unwittingly diminished. The bells toll for us, and so many know it not. When will our rare giants leave their personalities etched in the permanent record rather than in the ephemeral and distorted memories of their contemporaries? Are they doomed forever to be buried so quickly under the shifting sands of time? We, and they, deserve something better, and we trust that knowledge to achieve that end may sometime come.

Monumental personalities are not to be expected as models throughout. There are likely to be facets that are demeaning, as well as facets of nobility; all are likely to be glaringly apparent, larger than life. Ed was no different, having a few minuses scattered among the many pluses. His famous feuds, prejudices and bluntness were not constructive, but his selective generosity, diligence and versatility were an inspiration. Students in his era were commonly trained in the arts of intolerant belittlement, of the snide pejorative, of the "search for error," much to the detriment of scientific advancement. Unfortunately at least by example he contributed to the strength of that movement through his readiness to feud. He was not a conciliator, nor was he very tolerant of shortcomings, as he saw them, in others. But he was part and parcel of his era. Fortunately that particular trend has been reversed as constructive tolerance and mutual good will and helpfulness have come to dominate both intra- and interdisciplinary interaction; it is a trend to be diligently nurtured for the health of science and the betterment of man. Judging from his actions, I think Ed came in his retirement to endorse fully the changing winds, although whether his change was merely the mellowing of old age, or a change in philosophy, or was a misinterpretation on my part, is uncertain. Certainly his negatives tended to drop out as he grew older, and his last years left him the most thoroughly likeable person of his life, insofar as I knew it.

Nevertheless he was his own master throughout, meeting the Grim Reaper alone in his own apartment, as he wished. He detested the medical profession and everything about it — hospitals, dentists, the whole gamut —except as emergency demanded or as self-
treatment could be applied. He was exceptionally resourceful in meeting his own medical needs, and in fact his only entanglement with professionals, of which I was aware, was with a dentist — an experience which only embittered him still further for he was never orally comfortable thereafter. He stoutly resisted medical consultation when he injured himself falling on ice two winters before his death, and he would have no consultants on the occasions when he would faint unpredictably in his last years.

Although his unusually strong constitution kept him in good health most of his life, he found increasing difficulty in retaining food as he grew older, and indeed starvation was the probably ultimate cause of his demise as he became too weak to leave his apartment in his last few months, although he was faithfully brought food and observed daily by nurses engaged by the Museum.

Likewise to the very end he insisted upon the same independence and privacy that marked his whole life: that no services be held after his death and that no one be notified until his ashes had been interred. Today his remains lie with a simple marker in the Pioneer Cemetery of Lawrence, Kansas: Edward Harrison Taylor, April 23, 1889—June 16, 1978.

So drift the sands of time to close over this legendary enigma with the finality of eternity — an ultimate truth no amount of discourse, review, reappraisal, eulogy or lament can alter, and before which we must bow.

II

To Hazel Clark Taylor I am indebted for a letter and its enclosures written June 26, 1978 to Irvin E. Youngberg, Secretary Emeritus of the University of Kansas Endowment Association. With her permission, excerpts from them, with a few subsequent emendations, are quoted below for the benefit of Ed's legion of personal friends and associates, and for biographical record.

"P.O. Box 66
Omena, Michigan 49674
June 26, 1978

Dear Mr. Youngberg:

Receipt of a copy of your letter to my daughter Patricia Taylor Kulick, enclosing two copies of press releases announcing the recent death of Edward H. Taylor, her father and my former husband, is greatly appreciated.

Few human beings, I believe, have lived as adults so nearly as they chose, as did Edward. Few, perhaps, have had so many loyal and devoted friends. It is evident that he chose his friends wisely.

It is my deep regret that he did not choose to seek professional medical help in his later years, in order that his life might have been prolonged. Along with his host of friends, recognition and acclaim for his contribution to science and to standards in education, he had as a stimulus an abundance of high adventure. Never could I forget the fascinating wonderful five or more years that I shared during his earlier life in the Far East!

Being a mother, I feel that an additional biological contribution that Edward made to life should be recorded, namely, his progeny. Though they did not intrude upon his special world, those issue who survive him are destined to carry into time their heritage of Edward's traits and potentialities — his concept, as I remember, of his life after death.

For such a record if it be pertinent, I enclose a resume of his issue: one daughter deceased and those surviving; one daughter, one son, four grandsons, one granddaughter and one great-grandson, born, I believe, on the day that Edward died, June 16. But the boy's father when he telephoned me the good tidings, was so bewildered that he could not quite remember whether the birth had occurred on the day of his call, or the day before!

I am exceedingly grateful to you for your courtesies and to all who helped Edward in his last days.

Sincerely,

(signed)

Hazel Clark Taylor"

Mrs. Taylor's summaries of Ed's progeny, written at the same time as the letter to Youngberg, as are follows:

A. Children

"1. Patricia Taylor Kulick, born May 28, 1923, Kansas City, Missouri. Graduated from Randolph Macon Woman's College, Lynchburg, Va. Majored in math, minored in economics. Except for mother's payment of greater part of tuition for first year she provided for herself through scholarships and summer jobs. When war was imminent she was chosen, along with 39 other women graduating from colleges east of the Mississippi, by Chaunce Vaught Aircraft Corp. to be put through Guggenheim School of Aeronautics, all expenses paid and pledged to work in Chaunce Vaught plant for one year, through all phases of production in preparation for the drawing boards and design. Before the pledged year was completed, however, she was tapped by the Navy to work on a "crash-safety" program and later to organize captured German aircraft documents. At the war's end she married, then worked for Goodyear in Akron, Ohio, on lighter-than-air craft. Then she worked for various corporations under government contract to build war planes, the orbiting platform, submarines and battleships. Her special field is *reliability*.

After 35 or more years of experience in this field, she now works for Litton's battleship program at Pascagoula, Miss. In addition to her engineering job, she has a real estate broker's license and an antique dealer's license. She restores antique and historic houses on "The Gulf" (of Mexico), does public relations for the Sierra Club, works in an engineering club and in the Episcopal church of Ocean Springs, Mississippi. She lives at 7 Windlo Circle, Ocean Springs, Miss., in a glorious old home on the shore of a bayou.

"2. Richard Clark Taylor, born March 18, 1926, Kansas City, Missouri. Veteran of World War II, having enlisted as an 18-year-old reservist, AAF. When in middle of second year at Haverford College, he was called to active duty. Through the duration of war, he never saw combat, but was shifted from one training base in USA to another. After war, he returned to Haverford on G.I. Bill of Rights. He had outside jobs, as he had had his first years, his mother paying tuition for first year and one half. He married a Bryn Mawr graduate assistant in the biology department, and majored in psychology as a pre-med, hoping to continue in medicine, but after graduation from Haverford, with so many GI's applying and already accepted in his field, there were no openings. He got a job, first in a lumber firm and, when the owner died, one in "personnel" with Swift and Co. He has developed a special type of "Industrial Relations" program for Swift, has worked for them in Mass., New Jersey, and now in Omaha, Nebraska. He has two children, one son and one daughter. He has married for a second time and has step children, two still at home, a boy and a girl. He resides at 6410 South 149 Ave., Omaha, Nebr."

B. Grandchildren

"1. Christopher Verdery, born Nov. 1946, Milford, Connecticut, to Patricia. Now lives with mother in Mississippi and assists her in restoring old houses. He is a veteran and casualty of the Vietnam war. Drafted against doctor's advice because of his very low blood sugar, was assigned to medical corps, because he did not believe in the war. Served in several army hospitals "stateside," before being sent overseas to serve with the "jungle patrols" called "nests" who were sent out at night in an attempt to capture enemy patrols. Successful for a time, Chris' nest was later ambushed. When he attempted to rescue a comrade who was badly wounded, he received many wounds, none fatal, but his right arm was broken and the radial nerve severed. Flown to hospital in States, other nerves were attached to the muscles of his arm, hand and fingers. Then he spent many months making them manipulate. Has made wonderful recovery, though still not back to normal. He has his grandfather's aversion for doctors and hospitals and his fabulous memory. His interests are the opera and trees of the USA, a subject he has studied seriously since childhood in the manner of a systematic scientist. He is a graduate of the University of California. Excellent in history. Knows Spanish, French and other European languages. Majored in philosophy in college!

"2. Philip Calvert Taylor, born March 24, 1950, South Hamilton, Mass., to Richard. Graduated Haverford College, and Medical School of Temple University, Philadelphia, Pa., with an M.D., now interning at a private hospital in Mass., expects to practice as an internist. At end of second year at Haverford, Philip took off two years in order "to see the world." Worked on canal boat from Amsterdam to many cities of Europe. Then with his sister Linda, tramped through Europe and some of the mid-East. Married last year at Temple and is father of Edward's first great-grandson. Philip and wife Janet, a graduate of Bryn Mawr, live at 479 Sherman St., Apt. 4, Canton, Mass., 02021.

"3. Linda Taylor Kettering, born Jan. 10, 1952, Hamilton, Mass., to Richard. Graduate of Drew University, in New Jersey. Majored in education, graduate years in special education for retarded and special children. Works in that field, has M.A. She spent one summer vacation with her brother Philip in Europe and in the junior year of college went to the University of Amsterdam, Netherlands, and resided with a Dutch family, under a program of Syracuse University. Her husband, Frederick Kettering, is in the auto sales business. They reside at 1333 Old Gulp Road, Villanova, Pa., but plan to move to New Hampshire.

"4. David Brian Kulick, born March 16, 1956, Akron, Ohio, to Patricia. David has finished his fourth year at Temple University, Philadelphia. Next year he hopes to receive his degree in architecture. Now is credited with A.B. in Design. Has already done professional designs for remodeling of building facades, renewal designs for urban renewal programs, and has sold numerous watercolor paintings. Has worked as a contractor, building a facade he designed for a building in the Old Town Plaza of Covington, Kentucky.

"5. William Michael Kulick, born Dec. 4, 1959, San Diego, California, to Patricia. Will be a sophomore at Haverford College this fall. Has been active in the musical activities of both high school and college. Leads a musical group "off campus." Leans toward the theatrical arts. He is a good mechanic; has wired and plumbed several of his mother's houses. For three or more years acted here in Michigan as Life Saver and Water Safety teacher for the Leelanau Township Beach. In summer of 1978 worked as Youth Director for the Omena-Traverse Yacht Club."

C. Great Grandchildren

"1. Cory Philip Taylor, born June 16, 1978, Princeton, New Jersey, to Philip out of Richard."

As a footnote to this parade of progeny, it should be observed that Ed Taylor delighted in the enrollment of his son at Haverford College, where Ed implied he had taken courses from his long-time nemesis E. R. Dunn. The association was strictly coincidental, but a strong precedent was set, since two grandchildren, one from each child, returned there for their undergraduate college degrees.

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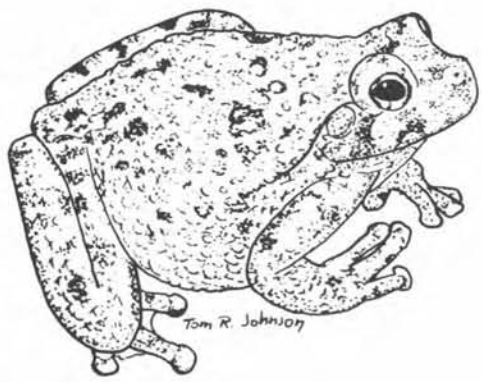
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EDWARD H. TAYLOR MEMORIAL FUND

A memorial fund for graduate education in herpetology has been established at The University of Kansas Endowment Association. Persons donating $10.00 or more will receive a complimentary set of prints of four color plates. The prints of watercolor paintings by Linda Trueb recently were published in *The Biology of Equatorial Herpetofauna in Amazonian Ecuador* by William E. Duellman, and consist of 1) treefrogs, 2) poison-arrow frogs, 3) anoline lizards, and 4) false and true coral snakes. There is only a limited number available. Should you wish to contribute to the Memorial Fund, please make your check payable to **Kansas University Endowment Association** and send to E. H. Taylor Memorial Fund, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045 USA.



THE CONCEPT OF PHENOLOGY AND ITS APPLICATION TO THE STUDY OF AMPHIBIAN AND REPTILE LIFE HISTORIES

INTRODUCTION

A basic understanding in the biological sciences, especially ecology, is that organisms respond in various ways to seasonal and cyclic changes of their environment. The sequential production of leaves, flowers, fruits and seeds of many plants is familiar to us all, as is the sequence of spring emergence, mating, egg laying and hatching or birth of many animals. The study of such seasonal events and their relationship to the environment is phenology, recently defined as "the study of the timing of recurring biological events, the causes of their timing with regard to biotic and abiotic forces, and the interrelation among phases of the same or different species" (Lieth, 1974).

Modern concepts of phenology began with Carolus Linnaeus in 1751 (Hopp, 1974) and biologists, primarily botanists, have been active in this area since then. Only relatively recently have scientists in other disciplines been concerned with phenological events (Andrewartha, 1952; Cohen, 1970; Heatwole, 1976; Lofts and Murton, 1968; Perrins, 1970; Smith, 1974; and others). The meanings, uses and models have been largely developed by botanists and these are slowly being incorporated in zoological areas.

There has been a growing awareness of phenology in herpetology. Although herpetologists are aware that life history events of poikilotherms are correlated with seasonal environmental events, only recently (Dowling, 1974) has there been an effort to establish a network of observers such as the botanists have in many states and countries. In this article, I review the concept of phenology, discuss some known phenological events in herpetology, provide a rationale and methodology for a national program and suggest uses for phenological data.

THE CONCEPT OF PHENOLOGY

Phenology is concerned with the study of seasonality, "the occurrence of certain obvious biotic and abiotic events or groups of events within a definite limited period or periods of the astronomic year" (Lieth, 1974). Seasonality is obviously pronounced in temperate regions but it also occurs in the tropics (Frankie, *et al.*, 1974). Plant and animal life histories are directly or indirectly tied to recurring climatic events, such as periods of rainfall, temperature flux and photoperiod. Many organisms "key" on other, closely associated organisms, and are thus indirectly influenced by environmental forces. Most, if not all, influence of external factors is on physiological processes which, in turn, stimulate and control behavior. Indirectly influenced organisms are those whose autecology is closely tied to directly influenced habitat associates. No organism, however, is completely independent of either biotic or abiotic forces.

Species have evolved under the influence of environmental forces (abiotic) and biological interactions among species, such as competition and predation (biotic). These latter forces are the constraints that produce the limits of the realized niche, and they vary through space and time. Environmental forces, although fluctuating, recur through space and time, and thus offer factors on which an organism can cue to start or stop some life history event. Phenology, then, is concerned with the patterns of life history events and the mechanism of their direct or indirect adaptiveness to abiotic forces.

APPLICATIONS AND EXAMPLES IN HERPETOLOGY

Amphibians and reptiles offer good subjects for phenological investigations. They are poikilothermic and may be more closely tied to the physical environment than homeotherms. Some reptiles are known to detect photoperiod changes with the parietal (third) eye, and both reptiles and amphibians (herps) respond to changes in temperature and rainfall. In this regard, they are directly influenced by environmental (abiotic) factors. Herps also respond seasonally to changes in resource availability, and in this sense are indirectly influenced. Biotic factors, such as predation and competition, also bear on seasonality by placing constraints on responses.

The annual cycle in temperate reptiles, after emergence from brumation (winter dormancy), can be generalized as follows: lipid utilization for gonadal development and mating energy; mating; egg laying; hatching (or in the case of viviparous species, embryonic development and birth); appearance of young; storage of energy in fat bodies; and, winter estivation. Emergence in these animals depends, at least in part, on temperature and photoperiod. Some phenophases depend on the quality and quantity of available resources, which in turn depend on environmental factors, especially rainfall.

In amphibians, specifically anurans, the annual cycle is generalized as follows; emergence (following a short period of adequate temperature and/or rainfall); breeding; egg laying; hatching of larvae and tadpoles; metamorphosis; and storage of fat for winter estivation. As above, timing and duration of some phenophases depend on available resources.

Not all reptiles or amphibians follow these sequences. Some breed throughout the year (many salamanders), while others breed in the fall or both in spring and fall. Offspring of several turtle species overwinter in the egg or nest and emerge the following spring (Gibbons and Nelson, 1978). Many tropical species follow annual cycles related to wet and dry seasons (Licht and Gorman, 1971).

Herps have a core control system that functions in coordinating and linking environmental events. The basic components are (after Farner, 1967): 1. external environmental information; 2. perception by receptors; 3. relay to brain centers and hypothalamus; 4. evaluation by circadian clock; 5. production of hypothalamic neurohormones and transport to pituitary gland; 6. secretion by anterior pituitary of hormones involved in lipid utilization and behavior and gonadotropins that stimulate gonadal growth, production of sex hormones and gametogenesis, all leading to the attainment

Table 1. Dates for selected phenophases of the teiid lizard *Cnemidophorus tigris*.

LOCALITY	EMERGENCE	MATING	EGG LAYING	HATCHING	AUTHORITY
S. Nevada	—	—	—	late July	Tanner & Jorgensen, 1963
Colorado	May 1	—	June 21	—	McCoy & Hoddenbach, 1966
S. Central AZ	March	May-June	June-July	late June-early Aug.	Parker, 1972
Winkler Co., TX	mid-April	—	—	late May	McCoy & Hoddenbach, 1966
Trans Pecos TX	—	—	—	July 30-Aug. 3	Milstead, 1957
S. New Mexico	—	—	—	July 17	Milstead, 1957
S. E. AZ	March-April	May-June	June-July	July-early Aug.	Mitchell, 1976a
N. Chihuahua	—	—	—	Aug. 30-Sept. 2	Smith, *et al.*, 1963

Table 2. Dates for selected phenophases of the viviparous colubrid snake *Thamnophis sirtalis*.

LOCALITY	EMERGENCE	MATING	BIRTH	AUTHORITY
Ontario	April	April 11-25	October 9	Milnes, 1946; Schueler, 1975
Manitoba	Apr. 15-early May	Apr. 29-June 2 Aug. 30-Sept. 24	—	Gregory, 1974
Michigan	—	late Mar.-early May	late July-mid Sept.	Blanchard & Blanchard, 1942; Carpenter, 1952
New Hampshire	—	late May-early June	Aug. 2-26	Zehr, 1962
Ohio	January	—	July 3	Conant, 1951
Indiana	—	March	July	List, 1950
Kansas	March	Mar.-Apr.	late July-early Aug.	Fitch, 1965
Louisiana	—	—	June 24	Meade, 1934
Florida	—	—	May 31, Jan. 11	Barton, 1952; Triplehorn, 1955

of breeding condition. This basic scheme is thought to pertain to temperate reptiles, but the sequence and functioning of this system in amphibians with various life histories and species in the tropics is not yet understood.

Studies in the literature are virtually useless to an extensive phenological approach to herpetology. In Tables 1 - 4, I present dates for several phenophases from different North American localities. As indicated, the information is widely scattered in the literature and is quite imprecise. Table 1 shows that emergence times are more completely known for lizards than for snakes and turtles (Tables 2 - 4). Most of the data on snakes, including viviparous (Table 2) and oviparous (Table 3) species, deal with the phenophase of birth or egg laying. Egg laying is also the best known phenophase for turtles (Table 4). For amphibians, breeding time over geographic areas is the best known phenophase (Table 5). Emergence is equated with breeding (calling of males). Little is known of hatching dates or dates of metamorphosis in different localities.

Far too few data exist in the literature to gain even a partial understanding of the geographic variability of life history patterns of a single species. We are far behind ornithologists in collecting this kind of information; one recent study used 8544 observations to construct a phenological map of robin nesting times in the U.S. (James and Shugart, 1974). At the present time we can, at best, come up with only one or two scores of data for **any** species!

Although some data exist for some phenophases of some species, little, if any, exists for others. I can find only 12 emergence dates for the continental common garter snake (*Thamnophis sirtalis*). I can find none for termination of annual activity in this species. These dates should be made available, as I am sure many are tucked away in field notebooks. Mass collection of phenological data would aid in understanding geographic variation of life history events, the timing of these events relative to environmental forces and the understanding of the structure of amphibian and reptile communities with regard to the partitioning of time.

METHODOLOGY

It seems appropriate here to say something about data collection. Obviously, one needs to record information on phenophases and their attributes (described below). However, it is also important to collect data on biotic events and environmental factors other than herp phenophases at the same time. As Dowling (1974) points out, some species may cue a phenophase on the appearance of a phenophase of a habitat associate, for example, the production of leaves of an associated plant. Although a species' phenophase may not actually respond to an associate's phenophase, it may respond to the same environmental factor. Thus, the predictive powers of herp phenology are of obvious value. Prediction of emergence times, mating activities, *etc.*, constitutes important information for resource managers, researchers and the layman.

The methods of collecting phenophase data are simple and inexpensive. One needs a field notebook, thermometer and field guides to local reptiles and amphibians and flora. Data, in addition to herp phenophases, could include air and water temperatures (if applicable), percent cloud cover, elevation, locality, condition of selected local flora, time of day (*e.g.*, EST, CDT, *etc.*) and date. If a national program becomes established (see below), I suggest we devise data cards that can be filed and/or converted to computer tapes for eventual analysis. Regional organizations can devise data forms applicable to their own areas and coordinate efforts of individuals, societies, high school groups and college class projects. Data could be directly noted on data forms or transferred to forms from field notebooks.

DEFINITION OF HERPETOLOGICAL PHENOPHASES

In the sense used in this paper, phenology is concerned with obvious and visible life history events. The following phenophases are taken, in part, from those outlined by the US/IBP Phenology Committee (French, *et al.*, 1972) and I offer these as a basic set of phenophases on which the herpetological community should collect data. As there is great diversity in reptile and amphibian life histories, other phenophases may be suggested by workers on species that do not exactly fit these general categories.

Arrival: emergence of individuals from brumation.

Departure: observation of dormant individuals, noted absence of active individuals or observation of last active individuals.

Courtship: observation of ritual behavior or mating pairs of reptiles and salamanders.

Breeding: characteristic mating call of anuran species and/or observation of mating pairs.

Egg laying: deposition of eggs or construction of nests of oviparous species.

Larvae: appearance of larval stages of amphibians.

Metamorphosis: appearance of transformed individuals of amphibian larvae.

Hatching: observation of hatching or appearance of juvenile individuals of oviparous reptile species of frogs with direct development.

Birth: observation of parturition or appearance of juvenile individuals of viviparous species.

Table 3. Dates for selected phenophases of the oviparous colubrid snake *Elaphe guttata*.

LOCALITY	MATING	EGG LAYING	HATCHING	AUTHORITY
Maryland	May-June	late June	Aug. 26-30	Groves, 1957
Virginia	May-June	June 18-July 5	Aug. 22-Sept. 8	Rae, 1974; pers. obs.
North Carolina	—	June 8-20	Aug. 19-Sept. 22	W. M. Palmer, pers. comm.
South Carolina	—	June 2	July 26-29	W. M. Palmer, pers. comm.
Florida	May 24-27	June 26-July 2	Aug. 28-Sept. 1	Holman, 1960; MacMahon, 1957
Kansas	—	July 4-8	—	Clark, 1953
Texas	—	June 14-July 9	Aug. 7-Sept. 18	Perkins, 1943; Werler, 1951

Table 4. Dates for selected phenophases of the emydid turtle *Chrysemys picta*.

LOCALITY	MATING	EGG LAYING	HATCHING	AUTHORITY
Michigan	March-May	June-early July	—	Gibbons, 1968
Wisconsin	—	late May-early July	—	Moll, 1973; Christiansen & Moll, 1973
Minnesota	—	June 1-July 28	—	Legler, 1954
Pennsylvania	Apr. 29-June 16	May 18-July 16	July-Sept.	Ernst, 1971
Illinois	—	May 12-July 22	—	Moll, 1973
Tennessee	May-June	July	—	Cagle, 1937
Louisiana	—	late May-July	—	Moll, 1973
New Mexico	May-July	May-July	—	Christiansen & Moll, 1973

Table 5. Breeding dates for the widely distributed tree frog *Hyla crucifer*.

LOCALITY	BREEDING PERIOD	AUTHORITY
New York	Apr. 1-June 15	Wright and Wright, 1949
New Jersey	April	Dowling, 1974
Virginia	Mar.-May	personal observation
Kansas	March	Collins, 1974
Alabama	Jan.-April	Mount, 1974
Georgia	late Nov.-March	Wright and Wright, 1949
Florida	late Dec.-March	Wright and Wright, 1949

The first observation of a given phenophase is used to score its appearance. In addition, the phenophases listed above have the following attributes:

Onset: first observation of a phenophase.

Termination: last observation of a phenophase.

Duration: time from onset to termination of a phenophase.

Extent: number of individuals in a given phenophase.

Timing: when the onset, termination and extent of a phenophase occurs during the calendar year.

CONCLUSIONS

Phenological studies of reproduction that deal with fat deposition and utilization, gonadal recrudesence, *etc.* (Licht and Gorman, 1971; Crews, 1975, for example) are important and justifiable investigations. However, phenology, in the sense used here, deals with obvious and visible events. My purpose here is to awaken the herpetological community to the importance of widespread data collection on visible herp phenophases and to make a plea for the establishment of regional and national phenology programs. Our understanding of the relation between life history events and the environment can be greatly expanded by mass collection of such data.

Dowling (1974) made a "modest" proposal to establish a phenology program in the U.S. To my knowledge, it did not provide the impetus for such a venture. He suggested that local societies and organizations make phenological studies, and implied that these organizations feed their data into a national central computer-based data set. The Virginia Herpetological Society has initiated a phenology program (Mitchell, 1976b), but to date, response has been poor. However, like any new program, it takes time to get off the ground and we expect good response in the future. No one at the national level has offered to coordinate data from societies or individuals scattered throughout the country but I concur with Dowling that this should be done.

He also suggested that we collect data on a few select species and phenophases. I disagree, as it is not too early to start collecting data on all phenophases of all species. Some data banks would be expanded rapidly, for instance, on anuran breeding phenophases, while others would expand slowly. Researchers could obtain data sets for analysis once date banks are large enough. The North American Nest Record Card Program has established user guidelines and search fees for those interested in obtaining data (D. A. McCrimmon, pers. comm.). Such guidelines could be devised for the herp phenology program. I suggest phenophase data on a national scale be collected in a manner useful for phenological mapping, a geographical approach. Phenophase maps could, by publication, be made available to the entire community. These would be useful to a large national segment: resource managers of parks, wildlife preserves, local societies, amateur naturalists, or anyone who has use (either scientific, applied or esoteric) for such information.

Opportunities in this area of herpetology for individual and group projects are immense. One can take data individually or coordinate efforts through local societies or other organizations. The high school or college biology teacher can initiate ongoing projects for classes and contribute valuable information to the national effort as well. It is important to remember, however, that data be collected in a uniform manner, no matter who collects it (see Definition section).

We are now only in the planning stage of setting up a herpetological phenology program, and my suggestions are made to be modified and improved upon. I write this article with hopes of generating interest in a national program, not to offer myself as coordinator, as it may imply.

I suggest the herpetological societies hold a roundtable discussion of invited participants at the next national meeting to consider the feasibility of setting up a national phenology program. Topics could include a rationale for establishment of such a program at this time and, if this is agreed upon, other topics can be added, such as methodology, coordination of efforts with regional societies, data format(s), appointment of a central location and society member for coordination of national data input, and last, but certainly not least, procurement of adequate and continued funding.

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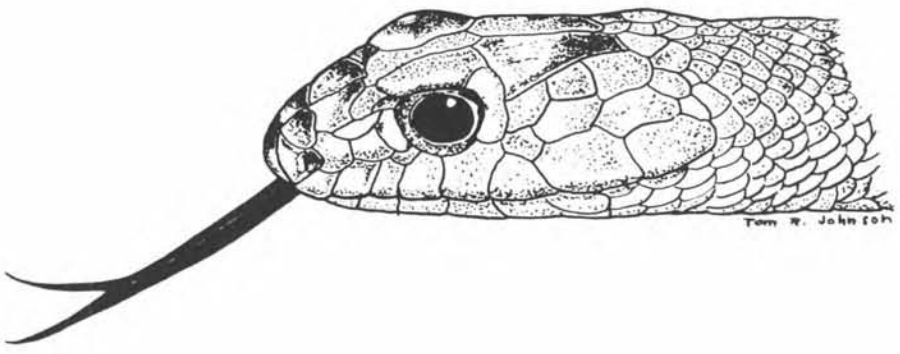
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ANOTHER INEXPENSIVE TURTLE TRAP

The use of hoop nets for trapping turtles has become standard procedure for the chelonian biologist since Legler's (1960) description of his own "simple and inexpensive" construction formula using aluminum tubing and cotton mesh. Rising costs of these materials has made Legler's traps relatively more expensive today than in 1960. This report is the result of my attempt to design a less expensive and more easily constructed turtle trap which still incorporated as many (or more) of the functional advantages of Legler's device as possible.

Like Legler's, my traps are based on the "funnel trap" design, but are made solely of 1" mesh poultry fencing (chicken wire). A 5' length of 5' width fencing is rolled into a 5' cylinder of approximately 18" diameter (circumference is about 56"). The overlapping seam (about 4") along the length of the cylinder is secured by bending the exposed cut wires (along the free edges) through the adjacent mesh and folding them over on the inside of the cylinder. This should be done with each exposed wire (every 1") along the entire length of both edges. The result is a secure, open-ended 5' cylinder of wire.

Four one-foot cuts are then made in each end of the cylinder and parallel to the long axis. The one-foot cuts should stop at the reinforcing wire that circles the cylinder 1' from the end. The cuts should be spaced equidistantly around the diameter of the cylinder, with the cylinder's seam positioned midway between two of the cuts. The corresponding cuts on the opposite end of the cylinder should be aligned. The open-ended cylinder is now complete along the central three feet of its length with four equal size flaps (each about 12" x 14") on each end.

To construct the throats of the funnels, each flap must be modified to form an equal trapezoid with the previously mentioned 1' reinforcing wire and the distal end of the flap comprising its parallel edges. The two flaps (one at each end) with the median seam, and the corresponding two flaps across the cylinder are then identically folded along the cut edges (those parallel to the cylinder's axis) to form the non-parallel sides of the trapezoid. The base of the trapezoid (about 14") is the reinforcing wire; the opposite parallel side is the central 6" of the distal edge of the flap. The remaining lateral right-triangular areas (with base and altitude about 4" and 12", respectively) are folded outward with respect to the cylinder, to a position perpendicular to the plane of the trapezoidal flap.

The remaining four flaps (two at each end) are folded slightly differently. They are folded in the same trapezoidal shape, but the short parallel side must measure only about 3" and the lateral right-triangular areas (about 5" x 12") must be folded completely inward (with respect to the cylinder) to lie flush against the inside of the trapezoidal flap.

The four larger trapezoidal flaps with the outward-projecting flanges are then folded down inside the cylinder at the 1' reinforcing wire diameter. The remaining four simpler trapezoidal flaps are next folded down into the cylinder. The ends of each adjacent trapezoid's short parallel side are brought into contact and wired there to produce the throat of the funnel (ca. 3" x 6"). Altering the dimensions of the short parallel side of the trapezoidal flap will alter the size of the funnel's throat, in order to accommodate the side of the turtle the collector desires or anticipates.

The completed trap is more a rectangular box (about 36" x 14" x 14") than a cylinder, and a length of nylon twine is tied through the double thickness of the seam along one of the sides, for casting and retrieving the trap.

The traps are packed by placing a trap with one rectangular side flush to the ground and compressing the trap diagonally so that a second rectangular side also comes to lie against the ground. Additional traps are similarly placed atop those already folded, and also compressed. A loop of twine is placed over each end of the stacked traps to hold them in their flattened, compressed position. Each trap is resilient enough that removal of the loops allows them to completely unfold. At most a little manual rebending or reshaping of the wire is necessary to ready the traps for setting.

Total material cost averages about $2.00 per trap (1978 prices; six-foot-width poultry fencing averages less than 40¢ a running foot). With gloves and wire cutters (or tin snips), a single trap can be constructed in about 30 minutes. I further reduce construction time by assembling several traps simultaneously step by step.

Individual traps weigh just under three pounds and (compressed) occupy a space of about 36" x 28" x 2" (or 18" x 28" x 4" if folded over). I carry traps in bundles of five or ten; ten bundled traps fit in a volume 36" x 28" x 22".

Like Ernst (1965), the bait I have found most effective and satisfactory is canned sardines (in oil). The cheapest brands can still be purchased for less than 25¢ each (or cheaper by the case). To insure speed, ease, and cleanliness of baiting and rebaiting, I prefer to punch only small holes in the can and use the entire can of sardines for each trap setting. Following use, the entire can is discarded. This procedure has the additional advantage of not permitting captured turtles to consume any bait. Thus, interference with the turtle population is kept to a minimum (important to long-term life history studies), and digestive tract contents are not contaminated (important for feeding studies). Other baiting techniques, as well as information on optimal trapping habitats are in Legler (1960). In addition to the potential trapping sites mentioned by him, I have had excellent success with funnel traps (even unbaited) placed in culvert pipes, especially if pipe diameters only slightly exceed those of the traps.

My trapping experience in Mexico and the United States with both this design and Legler's (1960) indicates that my design is at least as effective as Legler's, and further, it is my subjective opinion that the rigidity (*i.e.*, unsagging walls) of my traps facilitates more rapid entrance of turtles. I have frequently caught as many as ten to fifteen *Kinosternon* in one trap in a single one-hour setting.

In conclusion, I feel that in addition to being less expensive, my trap design has two distinct advantages over Legler's (1960). The first is greater durability coupled with pliability, reflecting the construction materials. Alligators, muskrats, large snapping turtles, and other animals have literally turned the funnels of my traps inside out to gain their freedom. At most, repairs to the traps involved minor bending and wiring, whereas cotton nets similarly damaged are not so easily repaired. In addition, even treated cotton netting is not as long-lived as steel wire (nylon netting is an obvious alternative, but the cost is considerably higher). Several of my traps have endured major annual field trips to Texas and Mexico, and regular local use in Florida and Indiana for over five years, and show little sign of age. I have almost eliminated rust problems by not leaving traps in the water when not in use and by storing them in a dry place between use.

A second advantage of the wire trap is its non-absorbency. Cotton (or even nylon) hoop nets such as Legler's (1960) often dry very slowly, whereas simply shaking a wire trap removes nearly all excess moisture. This reduces the amount of dirt and debris that clings to the traps and eliminates the problem of placing dripping traps in the field vehicle. In addition, unpleasant, fishy odors from bait or habitat sampled are often absorbed by hoop nets, but are not a problem with wire traps.

ACKNOWLEDGMENTS

Diderot Gicca, Peter Meylan, and Ron Magill were indispensable in field testing the traps and offering suggestions for improvement. They each have made more trap settings for me than I'm sure they care to admit. My traps were designed and implemented while I was supported by the University of Florida and housed at the Florida State Museum.

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JOHN B. IVERSON, Department of Biology and Joseph Moore Museum, Earlham College, Richmond, Indiana 47374 ●

SHELL DEFORMITY IN A BOX TURTLE

The Malayan box turtle, *Cuora amboinensis* (Daudin) is distributed throughout the S. E. Asian region (Pritchard, 1967; Smith, 1931).

From a consignment of such turtles given to the Sentosa Corallarium in Singapore in May 1978, a female adult specimen (carapace length 17 cm) with a deformed shell was recovered. It is now kept alive at the Zoology Department of the University of Singapore.

A normal specimen is shown in figure 1. The specimen with the deformed shell is shown, partially extended, in figure 2. The deformity is apparent in the disproportionate growth of the marginals and plastron in relation to the carapace. The carapace does not appear to be kyphotic as its normal shape is retained. Figure 3 shows clearly the overgrown plastron (length 19 cm) extending beyond the anterior and posterior margins of the carapace whereas in the normal shell, the plastron never protrudes beyond the carapacial margin.

The turtle when fully extended appears to be too big for its carapace. Its movements are not affected by the deformed shell. However, when retracted, the plastron cannot be pulled up to provide complete protection to the animal as is the case for the normal individuals. The hinge between the pectorals and the abdominals of the plastron is immobile because of bone thickening and does not allow the anterior and posterior halves of the plastron to be pulled up to conceal the soft parts.

I wish to thank Mr. E. L. Lim, Curator of the Sentosa Corallarium for giving me the specimen.

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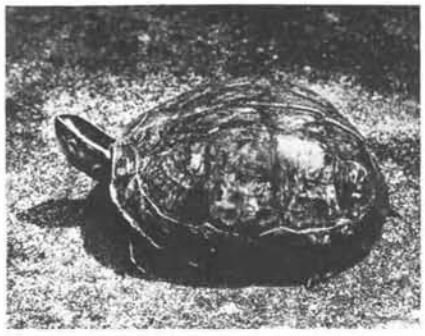






Fig. 1. Normal specimen of *Cuora amboinensis*.
Fig. 2. Deformed specimen of *Cuora amboinensis*.
Fig. 3. Laterial view showing shell deformity.

LICKING BY NEONATAL LIZARDS IN RESPONSE TO NOVEL STIMULI

Individuals in the anguid genera *Gerrhonotus* and *Ophisaurus* typically lick new objects in terraria (F. R. Gehlbach, A. F. Echelle, pers. comm.). This behavior also occurs in the iguanid lizard, *Sceloporus jarrovi* (De Fazio *et al.*, Copeia 1976:706-709). Because no experimental tests of substrate licking have been published for any neonatal or anguid lizards, I decided to test the behavioral significance of substrate licking in neonatal *G. coeruleus*.

Six, three month-old (6-8 cm TL), individually marked specimens were housed in two, adjacent 25 x 25 cm terraria, three per unit (randomly assigned). The lizards were born in captivity 29-30 September 1977 to a female from Humboldt County, California, and immediately separated from her. Limestone rocks, a water dish, and soil were in each terrarium. Each lizard was hand-fed two mealworms every two days following that day's experimental observations. Novel objects used in the tests were a 5 x 10 cm piece of oak bark and 3 x 5 x 7 cm limestone rock, presumably bearing lizard's odors, moved from the adjacent terrarium.

The subjects were given a two-week conditioning period. Then, the two terraria (lizard groups, A, B) were alternately considered experimental (four days with novel object) and control (four days without object) during tests with the bark followed by the rock. Number of substrate licks/lizard was counted at 1600-1800 hrs. each day. Each terrarium was watched for alternating 15 min. periods, with the order reversed each day of a test period. Illumination was a 40 watt bulb 25 cm above each terrarium floor (22-27°C).

Substrate licking was most frequent when new objects were present in the terraria but declined in frequency during the experiments (Table 1), perhaps because of habituation to the succession of stimuli (X^2=32, $P<0.001$, in a test for heterogeneity of the bark vs. rock results). Although group A lizards licked more often than group B lizards (X^2=42, $P<0.001$; X^2=9, $P<0.05$, in the bark and rock tests, respectively), the behavior of both groups supports De Fazio *et al.* (1976) in that licking is elicited by novel stimuli.

While individuals of two, different lizard families (Anguidae, Iguanidae) exhibit licking behavior, its general function (olfactory exploration and orientation) is apparently the same in both. Moreover, the present tests suggest that licking becomes less frequent with repeated stimulation and may be innate, since the neonates had very limited contact with their mother. Learning among certain of these subjects cannot be discounted, but at least one individual may have licked innately if learning took place.

Table 1. Substrate licking by neonatal *Gerrhonotus coeruleus* in response to novel stimuli.

Data are number of licks/group of three lizards/eight-day test period (*$P<0.001$).

GROUPS	BARK			ROCK		
	PRESENT	ABSENT	X^2	PRESENT	ABSENT	X^2
A	480	262	64*	406	196	73*
B	345	306	2	259	187	12*

Acknowledgments. — F. R., N. Y., and M. H. Gehlback, A. F. Echelle, and J. S. Johnston helped in various ways.

GRETCHEN GEHLBACH, 7717 Delhi Road, Waco, Texas 76710

News Notes

SIGMA XI GRANT OMITTED

The following grant from the Society of Sigma XI was inadvertently omitted from the list published in **Herpetological Review** 10(1): 7, March 1979:

Scott M. Moody, Museum of Zoology, University of Michigan, Ann Arbor. Consequences of continental drift on the evolutionary history of the lizard family Agamidae. $150.

GECKO INFO SOUGHT

Private collector and breeder of geckos is interested in contacting other breeders and collectors of geckos for exchange of information and dispersal of captive bred progeny. Nine species are presently available as surplus (both sexes), and individuals are also desired for breeding. Enough interest may warrant production of a newsletter. Those interested should contact: Dr. Michael J. Miller, Gekkonidae Breeding Foundation, 5223 South Francisco, Chicago, Illinois 60632, USA.

INFORMATION REQUESTED ON HUNDRED PACE VIPER

Roger Conant, Director Emeritus of the Philadelphia Zoological Garden, is devoting his time largely to research in herpetology and currently is endeavoring to complete a long monograph on the genus *Agkistrodon*, in collaboration with the late Howard K. Gloyd. There are several statements in the literature to the effect that the Hundred pace viper, *Agkistrodon acutus*, of southeastern Asia, reproduces by laying eggs as opposed to being a live-bearer; but no information about specific instances is available. If anyone associated with a live reptile collection has any hard data on the subject, please write to Roger Conant, Adjunct Professor, Department of Biology, University of New Mexico, Albuquerque, New Mexico 87131.

ERRATA FOR HR 10(1) MARCH 1979

Page 18, col. 3, para. 3, line 8: **they** should read **that.** Page 19, col. 1, para. 1, line 3: **one** should read **other.** Page 19, col. 3, para. 2, line 13: **specimens** should read specimen. Page 19, col. 3, para. 2, line 14: **were** should read **was.** Page 20, col. 1, para. 2, line 5: insert **In** between **reprinting** and **the.** Page 20, col. 1, para. 2, line 6: eliminate the comma after **Simmons.**

THE ELUSIVE CENTROLENID TADPOLE

Many of us have raised centrolenid tadpoles from eggs, but few have actually seen, or collected, these tadpoles in the field. If you have (or if you have raised froglets starting with freshly-collected eggs), please write to: JAIME VILLA, Biology, University of Missouri, Kansas City, Mo. USA 64110. Any information, no matter how fragmentary, will be greatly appreciated.

State Reptile

NORTH CAROLINA

On Friday, March 16, 1979 the North Carolina Senate approved a House-passed bill making the Eastern Box Turtle (*Terrapene c. carolina*) the official state reptile. The Eastern Box Turtle thus joins the ranks of the cardinal, the honeybee, the dogwood, the pine, gray squirrel, the Scotch Bonnet (state shell), the channel bass and the emerald to be honored by the state's law makers. The sponsor of the bill, Representative Chris Barker, stated that "In order for the turtle to make progress, he must stick his neck out" and "I think state officials and the General Assembly should emulate this."

CANNIBALISM INFORMATION REQUESTED

A literature search on cannibalism in reptiles is nearly completed, and the resulting information will be compiled into a review paper. I would appreciate any unpublished observations of reptile cannibalism in captivity or in the field so the review will be as complete as possible. Please contact Joseph C. Mitchell, Department of Biology, Virginia Commonwealth University, Richmond, Virginia 23284.

NOTICE OF A PERMANENT FROZEN TISSUE COLLECTION

The Museum of Vertebrate Zoology announces the establishment of a frozen tissue collection. During the past five years samples of tissues and blood have been taken from a variety of amphibians, reptiles and mammals. Emphasis is on exact data concerning geographic origin and identification, and voucher specimens are deposited in the regular collections of the Museum. The collection now contains samples from 3300 amphibians (45 genera) and reptiles (110 genera) and 5000 mammals (97 genera). Most specimens are represented by a sample of plasma, hemolysate and various organs including liver, kidney and muscle. Samples have been frozen in the field at -76°C or -196°C, and subsequently held in the laboratory at -76°C.

We encourage the donation of scientifically important samples of frozen tissues for inclusion in this collection. These frozen materials are available to qualified investigators subject to certain restrictions. All inquiries about loans and donations should be addressed to the Director, Museum of Vertebrate Zoology, 2593 Life Sciences Building, University of California, Berkeley, CA 94720 USA.

NEW PUBLICATIONS AVAILABLE

First Supplement to a Check List of West Indian Amphibians and Reptiles, by Albert Schwartz, Richard Thomas, and Lewis D. Ober, Carnegie Museum of Natural History Special Publication (5): 35 pp. $2.00.

SPECIAL OFFER: Supplement (above) and *A Check List of West Indian Amphibians and Reptiles* (1975), regular $6.25 value - **both** for $4.00.

Order from: Publications Secretary, Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, PA 15213.

WORCESTER STATE COLLEGE RECEIVES FEDERAL GRANT TO STUDY RARE TURTLE

The U.S. Fish and Wildlife Service (OES) has awarded a research contract to Worcester State College biologist, Terry E. Graham, for his proposed study of the rare Plymouth red-bellied turtle. Graham's research will be directed towards filling the considerable gaps in our understanding of this reptile. According to Graham, "knowledge of the feeding habits, nesting behavior, reproductive biology, survival, and distribution of these animals in Plymouth County, Massachusetts is largely unknown and may have considerable bearing on future deliberations regarding critical habitat designation and the continued survival of this endangered turtle. Through the use of radio-telemetry, x-ray techniques, live trapping, and intense field observation, I hope to learn all that I can about the red-belly before the end of this year."

The Plymouth red-bellied turtle is known from only a small group of ponds in Plymouth. Within recent years the land around some of these ponds has undergone extensive housing development and turtles have been found shot at one location. Earlier this year a significant step towards conserving these animals was made when the Nature Conservancy acquired a 181 acre tract of land including Crooked Pond, a known refuge of the red-belly.

Graham, whose expertise on the red-belly goes back more than ten years, indicates that unless we do all that we can to help these creatures, they may become extinct in the not too distant future. He is, however, optimistic that with effective protection and sound management this unique Massachusetts resource can be saved.

WORLD CONFERENCE ON SEA TURTLE CONSERVATION

The World Conference on Sea Turtle Conservation is being held under the joint auspices of the following U.S. government

agencies and private organizations which comprise the Conference Steering Committee:

World Wildlife Fund - U.S.
Defenders of Wildlife
New York Zoological Society
National Marine Fisheries Service
U.S. Fish & Wildlife Service
U.S. Department of State
Center for Environmental Education

Russell E. Train, President of World Wildlife Fund - U.S., is Chairman of the Steering Committee.

The Conference will assemble for the first time an international forum of scientists, conservationists and government officials for catalytic efforts directed at finding solutions to sea turtle conservation problems, as well as focusing public attention on an urgent species and resource conservation problem.

The Conference will be held at the Conference Center in the U.S. State Department, Washington, D.C., November 26-30, 1979.

PROPOSED SESSION TOPICS INCLUDE:

Value and importance of sea turtles
Present knowledge of sea turtle biology
Major threats to survival
Review of the status of world populations of sea turtles
Review of existing protective legislation and management
Conservation strategy: recovery plans, treaties, etc.

CONFERENCE SCIENTIFIC COMMITTEE

George Balazs - Hawaii Institute of Marine Biology
Mona Bjorklund - United Nations Environment Program
Archie Carr - University of Florida
Ken Dodd - U.S. Fish & Wildlife Service
David Ehrenfeld - Rutgers University
Wayne King - New York Zoological Society
Tom Lovejoy - World Wildlife Fund - U.S.
Peter Pritchard - Florida Audubon
James Tyler - National Marine Fisheries Service

Address All Correspondence to Vivian Silverstein, 1244 19th Street NW, Washington, D.C. 20036 202-659-9510

Regional Society News

THIRD ANNUAL SSAR REGIONAL HERPETOLOGICAL SOCIETIES CONFERENCE
12 AUGUST 1979

University of Tennesse, Knoxville, Tennessee

Conference Co-moderators:
Tom R. Johnson and John Murphy

1:00 PM Introductory remarks. **Tom R. Johnson** (SSAR)

1:10 PM Legislation: How It Effects You and How You Can Affect It. **Hugh Quinn** (SSAR and Houston Zoological Gardens)

1:40 PM Tennesse's Wildlife Regulations Pertaining to Amphibians and Reptiles. **James M. Smith** (Tennessee Wildlife Resources Agency)

2:00 PM Establishing a State Rare and Endangered Species List for Pennsylvania Amphibians and Reptiles, and Regulations to Protect Them. **C. J. McCoy** (Carnegie Museum)

2:25 PM Regulations and Permit Requirements Concerning Federally Listed Rare and Endangered Amphibians and Reptiles. **C. Kenneth Dodd, Jr.** (U. S. Fish and Wildlife Service, Office of Endangered Species)

2:50 PM Federal Regulations Pertaining to Zoo Operations. **James P. Bacon, Jr.** (San Diego Zoo)

3:25 PM American Alligator Management in Louisiana and Federal Regulations. **Ted Joanen** (Louisiana Department of Wildlife and Fisheries)

3:50 PM State and Federal Regulations Concerning the Sale of Herptiles. **Louis Porras** (The Shed — Miami, Florida)

4:25 PM Florida's Wildlife Regulations and the Pet Trade. **Paul E. Moler** (Florida Game and Fresh Water Fish Division)

4:45 PM Current Status of California's Herp Regulation. **John Brode** (California Dept. Fish and Game)

5:30 PM DINNER (site to be announced at conference)

6:30 PM Open meeting of assembled RHS representatives — discussion of general interest and resolutions. **John Murphy** (SSAR and Chicago Herpetological Society)

7:30 PM COLOR SLIDE PRESENTATION. All attending the RHS Conference are encouraged to bring their best herptile slides (limit 15).

NOTE TO ALL CONFERENCE PARTICIPANTS: Registration for the conference will begin at noon (no charge). Tables will be available for regional herp society representatives to display/sell their publications and other materials. No live specimens permitted.

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Geographic Distribution

CAUDATA

AMBYSTOMA LATERALE (Blue-Spotted Salamander). USA: CONNECTICUT: Fairfield Co: Danbury, Center Pond Brook. 2 October 1978. S. Fuller. Verified by J. D. Lazell, Jr. Museum of Comparative Zoology no. 96573. Extends range in Connecticut *ca.* 80 km SW; second locality for state (Klemens and Dubes, 1978. Herp. Review 9(2): 61).

Submitted by JAMES D. LAZELL, Jr., Massachusetts Audubon Society, Lincoln, Massachusetts 01773. ●

AMBYSTOMA TREMBLAYI (Tremblay's Salamander). USA: WISCONSIN: Sheboygan Co: Kettle Moraine State Forest, T14N, R20E, Sec. 20, E½. April 1977. J. Riedi and R. A. Sajdak. Alive in RAS personal collection. Mean erythrocyte area =1058 m². Kettle Moraine State Forest, T13N, R20E, on road between Sec. 6 & 7. 31 March 1978. J. A. Buday. Milwaukee Pub. Mus. Herpetol. Collection, MPM #16311. Mean erythrocyte area = 1027 m². Fond Du Lac Co: Kettle Moraine State Forest, T13N, R19E, Sec. 24, N½. 5 April 1978. J. A. Buday and R. A. Sajdak. MPM #16325. Mean erythrocyte area = 1011 m². Verified by A. A. Williams. These specimens extend the known range *ca.* 250 km SSE of previous Wisconsin records (Briggs, 1974, Herp. Rev. 5(1):18-19) and *ca.* 265 km NW of Indiana records (Minton, 1972, Amphibians and Reptiles of Indiana).

Submitted by RICHARD A. SAJDAK and JOSEPH A. BUDAY, Zoology Dept., University of Wisconsin-Milwaukee, Milwaukee, WI 53201. ●

STEREOCHILUS MARGINATUS (Many-lined salamander). USA: FLORIDA: Columbia Co: Osceola National Forest: intersection of FR 234 and Deep Creek (SW¼ NE¼ Sec. 32, T 2S, R 18E). 25 June 1977. S. P. Christman. Verified by H. W. Campbell. Florida State Museum, UF 39968. Southwestern extension of range of 29 km, first record for Columbia County, and first definite record for the Suwannee River (Gulf of Mexico) drainage (Christman and Kochman, 1975, Florida Sci. 38(3):139-141).

Submitted by STEVEN P. CHRISTMAN, HOWARD W. CAMPBELL, CHARLES R. SMITH, and HOWARD I. KOCHMAN, National Fish and Wildlife Laboratory, U.S. Fish and Wildlife Service, 412 N.E. 16th Ave., Gainesville, Florida 32601. ●

SALIENTIA

ELEUTHERODACTYLUS PLANIROSTRIS PLANIROSTRIS (Greenhouse frog). USA: LOUISIANA: in 8 hectare area surrounding Odenheimer Aquarium in Audubon Park Zoo, New Orleans. 31 August 1976. R. Atkinson & D. Dugas. Identified by B. Shreve & K. Forsgaard, Museum of Comparative Zoology. MCZ #92621-27. First record for Louisiana and a range extension of over 500 km (Conant, *A Field Guide to Reptiles and Amphibians of Eastern and Central North America*, Houghton Mifflin Co: Boston). The mottled phase of this frog has been observed in this locality since Spring 1975. The striped phase has not been seen.

Submitted by MARK PLOTKIN, Department of Herpetology, Museum of Comparative Zoology, Harvard University and RICH ATKINSON, Audubon Park Zoo, New Orleans. ●

RANA VIRGATIPES (Carpenter frog). USA: FLORIDA: Columbia Co: Osceola National Forest, numerous localities over northern half of forest. 9-30 March 1977. S. P. Christman, C. R. Smith, D. Gicca. Most specimens released; vouchers in Florida State Museum (UF 39383-5, 40226). First records from Columbia County and extends the known range about 35 km to the SW of the previous known limits (Means and Christman, 1976. *in* J. N. Layne, ed. Inventory Rare Endangered Biota of Florida. Fla. Audubon Soc., Microfilm). The southernmost locality is a cypress dome near the jct. of FS 234 and FS 263 (SE¼ Sec. 28, T2S, R18E) and the westernmost a similar dome at NW½ Sec. 13, T2S, R17E. The species is not especially abundant but appears widely distributed in cypress domes and the fetterbush phases of bay swamps throughout the northern half of the National Forest.

Submitted by STEVEN P. CHRISTMAN, HOWARD W. CAMPBELL, CHARLES R. SMITH, and HOWARD I. KOCHMAN, National Fish and Wildlife Laboratory, U.S. Fish and Wildlife Service, 412 N.E. 16th Ave., Gainesville, Florida 32601. ●

TESTUDINES

EMYS ORBICULARIS (European Pond Tortoise). SPAIN. MENORCA: BALEARIC ISLANDS: At Cala Enporter (south coast of island), in an irrigation ditch approx. 1 km inland. June 15, 1978. Collected and identified by C. Mattison and J. Pickett. An adult and a juvenile, the former observed only, the latter maintained alive by author. Confirms presence of this species on Menorca. Listed, but localities not given, by Salvador (1974, Guia de los Anfibios y Reptiles Espanoles, I.C.O.N.A., Madrid), but absent according to Arnold and Burton (1978, A Field Guide to the Reptiles and Amphibians of Europe, Collins, London). This small area of irrigated fruit groves probably represents the only suitable habitat for this species on the eastern half of Menorca.

Submitted by C. MATTISON, Department of Zoology, University of Sheffield, England. ●

CLEMMYS INSCULPTA (Wood Turtle). USA: MICHIGAN: Lapeer Co: Metamora-Hadley Recreation Area, 5 km NW Hadley. 30 May 1978. G. W. Schuett. Verified by R. E. Gatten, Jr. Private collection of GWS, 22313-1. First record for the county and extends range approximately 65.3 km NE of previous eastern record from Livingston Co. (pers. comm., R. Conant; C. H. Ernst; M. Hensley). Collected in a field near the entrance of the park. Subsequent collecting did not produce further specimens although one nearby resident when shown the present specimen said he had seen similar turtles from the area in the past.

Submitted by GORDON W. SCHUETT, 5061 Sheila Dr., Toledo, Ohio 43613. ●

GRAPTEMYS GEOGRAPHICA (Map Turtle). USA: MISSOURI: Dallas Co: 8.8 km SW Eldridge, Niangua River; Laclede Co: 4.8 km SW Nebo, Gasconade River. J. Ward. 17 Jun 78. Joseph P. Ward Collection, JPW 985, 986 and living. Records of this species in Missouri are limited. These specimens verify occurrence within range depicted in Anderson (1965) and Conant (1975); see *P. concinna* reference previously unsubstantiated.

Submitted by JOSEPH P. WARD, 808 MMKM Drive, Bellevue, NE 68005. ●

PSEUDEMYS (CHRYSEMYS) CONCINNA HIEROGLYPHICA (River Cooter). USA: MISSOURI: Laclede Co: Gasconade River, 4.8 km SW Nebo. 17 June 78. J. Ward. Joseph P. Ward Collection, JPW 994 and living specmen. Extends range 177 km NW nearest record, and approx. 55 km N range as depicted in Conant (1975) and Anderson (1965, *The Reptiles of Missouri.* Univ. Missouri Press, Columbia). One adult male sighted and two hatchlings collected. Two males collected by J. Ward, Sept. 1969, in North Fork White River, 3 km NE Tecumseh, Ozark Co, Mo., (specimens lost on loan) further substantiate occurrence of this species in mid-Missouri.

Submitted by JOSEPH P. WARD, 808 MMKM Drive, Bellevue, NE 68005. ●

SAURIA

AGAMA AGILIS. ASIA: IRAN: Jawad-Abad/Abardesh (railway station), 110 km SE Tehran. 17 June 1978. H. -H. Schleich. Zoological State Collection, ZSM 291/1978. Extends range 90 km SE of old record, 35 km SSW Tehran (Schleich. 1977. Herp. Rev. 8(4):126-129). This species ranges from Pakistan, Afghanistan, USSR to Iraq (Leviton and Anderson. 1970. Proc. Calif. Acad. Sci. 38(10):163-206). Specimen was collected under small *Acacia.*

Submitted by H. -H. SCHLEICH, Dept. of Herpetology, Zoological State Collection (ZSM), Munich, West Germany (BRD). ●

AGAMA CAUCASICA (Caucasian Agama). ASIA: IRAN: TEHRAN: Siah sang (10 km N Rudehen). 30 May 1978. H. -H. Schleich. Zoological State Collection, ZSM 289/1978/1-3. Range extension of 4 km W old record, 100 km E Tehran in Valley Golezard (Schleich. 1977. Herp. Rev. 8(4):126-129). Valley Golezard, 4 km W Polurd, NE Tehran. 5 June 1978. H. -H. Schleich. ZSM 290/1978. Elevation 2500m. An extension of range 35 km NW of old record cited above. This species ranges from Turkey to USSR, Iran and Afghanistan to Pakistan (Leviton and Anderson. 1970. Proc. Calif. Acad. Sci. 38(10):163-206).

Submitted by H. -H. SCHLEICH, Dept. of Herpetology, Zoological State Collection, Munich, West Germany (BRD). ●

SERPENTES

CEMOPHORA COCCINEA COPEI (Northern Scarlet Snake). USA: MISSOURI: Camden County, Lake of the Ozarks State Park. April 25, 1978. D. R. Ewing and L. C. Watkins. Verified by R. Goellner, Curator of Reptiles, St. Louis Zoological Park. First record for county and confirms presence of species in the north central Missouri Ozarks (Anderson, 1965. *The Reptiles of Missouri.* Univ. Mo. Press., Columbia). Specimen was photographed and released. Color slides of specimen are on file in the Natural History Section, Missouri Department of Conservation.

Submitted by TOM R. JOHNSON, Missouri Department of Conservation, P.O. Box 180, Jefferson City, Missouri 65102 and LARRY C. WATKINS, Florence Jones Reineman Wildlife Sanctuary, R. D. 1, Dolgeville, New York 13329. ●

COLUBER CONSTRICTOR (Racer). USA: NEW MEXICO: Mora Co., 27.4 km N Las Vegas. 10 June 1978. M. E. Seidel. Verified by L. D. Wilson. Univ. New Mexico, UNM 34629. First record for county; fills in gap in poorly known portion of the range (Wilson, 1978. Cat. Amer. Amph. Rept.: 218.1-218.4). Scale and tooth counts are typical of *C. c. flaviventris.* Collected in ecotone between pinyon-juniper and ponderosa pine forest at *ca.* 1829-1981 m.

Submitted by M. E. SEIDEL, Department of Biological Sciences, Marshall University, Huntington, West Virginia 25701 and LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, Florida 33176. ●

CROTALUS ADAMANTEUS (Eastern Diamondback Rattlesnake). USA: ALABAMA: Mobile County; Dauphin Island, on the north side of the island 10 km from the east end. 26 August 1978. W. Schroeder. Verified by K. Marion. Museum of Comparative Zoology, Harvard University. MCZ-156188. Length 117 cm. First recorded for Dauphin Island (Jackson and Jackson, 1970, Quart. J. Florida Acad. Sci. 33(4): 181-287). Two other specimens were sighted on 26 August, 1978. On 28 August, 1978 a second specimen (126 cm) was killed in the same area. Habitat "atypical" for *C. adamanteus,* sandy beach to high salt marsh covered by typical gulf coast vegetation.

Submitted by WILLIAM W. SCHROEDER, University of Alabama - Marine Science Program, Dauphin Island Sea Lab, P.O. Box 386, Dauphin Island, AL 36528. ●

ELAPHE OBSOLETA OBSOLETA (Black Rat Snake). USA: MASSACHUSETTS: Franklin Co: Sunderland, 1.6 km N Sunderland Center, W slope, Mt. Toby. 12 June 1978. J. Coddington. Verified by James D. Lazell, Jr. Museum of Comparative Zoology no. 154766. Extends range *ca.* 22 km N to new northern limit in Connecticut Valley and state (Babcock, 1929. **The Snakes of New England,** Boston Soc. Nat. Hist., p. 17). Additional living examples encountered and photographed; strong evidence of northward range expansion in historically well-known area.

Submitted by JAMES D. LAZELL, Jr., Massachusetts Audubon Society, Lincoln, Massachusetts 01773. ●

ERIDIPHAS SLEVINI. MEXICO. BAJA CALIFORNIA DEL SUR: Gulf of California, Isla Danzante. 28 July - 2 August 1974. S. Strand. California Acad. Sci. No. 140097. New island record (Soule and Sloan, 1966, Trans. San Diego Soc. Nat. Hist. 14:137-157). The specimen is unusually heavily pigmented in contrast to other insular and peninsular specimens, although the ventral surface of the body of all known specimens is immaculate. BAJA CALIFORNIA DEL NORTE: 7 km W (by road) Bahia de los Angeles. 7 Sept. 1978. R. L. Seib. California Acad. Sci. No. 146982. First state record. Extends range 200 km NNW Sand Ignacio, Baja California Sur, Mexico (Seib, In press, *Herp. Review*), and 480 km NNW type locality, Puerto Escondido, Baja California Sur, Mexico. Collected at 21:00 by lantern light in a dry, rocky wash. The snake was actively crawling on a large granite boulder where several leaf-toed geckos were taken. In captivity, this specimen of *Eridiphas* ingested these geckos, *Phyllodactylus xanti,* on two occasions, each time regurgitating the lizard within a few hours. In contrast, the same specimen of *Eridiphas* successfully feeds upon *Uta stansburiana* and *Hyla regilla.*

Submitted by ROBERT L. SEIB, Museum of Vertebrate Zoology, University of California, Berkeley 94720. ●

NATRIX NATRIX PERSA. ASIA: IRAN: Aẑarbaijn: 10 km W Maku. 20 May 1978. H. -H. Schleich. Zoological State Collection, ZSM 292/1978. Range extension of 400 km W of oldest westernmost record near Astara on western shore of Caspian Sea (Schleich. 1977. Herp. Rev. 8(4):126-129). Ranges from Iran westward to Yugoslavia and the southern Balkan (Mertens. 1960. Die Amphibien and Reptilien Europas).

Submitted by H. -H. SCHLEICH. Dept. of Herpetology, Zoological State Collection, Munich, West Germany (BRD). ●

NERODIA RHOMBIFERA (Diamondback Water Snake). USA: TEXAS: Starr Co: 1 km N Garciasville, pools in Arroyo Garcia at US Hwy 83. 9 Oct 1976. J. Ideker. Verified by J. Ideker. MN HC/JI 4374. ♂, 577 mm TL, 530 mm SV, tail broken. Specimen fills hiatus along the Rio Grande between natural range (Webb Co, Texas: Brown, 1950, *An Annotated Check List of the Reptiles and Amphibians of Texas,* Baylor Univ. Stud., 259 pp.) and introduced range (Cameron Co, Texas: Conant, 1977, J. Herp. 11(2):217-220).

Submitted by JOE IDEKER, McDonnel Natural History Center, P.O. Box 1433, Edinburg, Texas 78539. ●

RHADINAEA FLAVILATA (Pine Woods Snake). USA: GEORGIA: Camden Co: Little Cumberland Island. 22 Aug. 1978 T. M. Mann. Verified by J. E. Kraemer. Specimen was photographed and released as the size of the population was unknown. Diagnostic photo sets will be given to the Univ. of Ga. and to the Savannah Science Museum. Habitat: Pine needle carpeted forest floor; sandy soil with little organic matter. Nearby vegetation included *Serenoa repens, Quercus virginiana, Pinus elliottii, Vaccinium arboretum, Myrica cerifera, Juniperus* sp., *Ilex* sp., *Persea* sp., and *Vitis* sp. There is a man-made artesian-fed sulphur water pond 30m SW of the collection site. First sighting of this species on a barrier island other than Shackleford Banks, N.C. (Gibbons and Coker, 1978, Amer. Midl. Natur.

Submitted by TOM MANN, P.O. Box 8453, Clemson, South Carolina 29632 and JED E. KRAEMER, Dept. of Zoology, Univ. of Ga. 30602. ●

SONORA MICHOACANENSIS MUTABIL-IS. (Mexican Ground Snake). MEXICO: Sinaloa; Plomosus, 1066 m. 25 August 1976. J. A. Campbell. Verified by D. R. Frost. University of Texas at Arlington, UTA R-7227. First record for the state of Sinaloa and a range extension of *ca.* 150 km NW from the nearest locality, Jesus Maria, Nayarit. This species may occur in adequate habitat (montane tropical deciduous forest) as far north as southeastern Sonora and southwestern Chihuahua.

Submitted by DARREL R. FROST, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

THAMNOPHIS SIRTALIS CONCINNUS X PICKERINGI. (Common Garter Snake). USA: WASHINGTON: Snohomish County: Jennings Memorial Park, Marysville. 15 July 1977, 26 September 1977, 1 May 1978. G. C. Norman and B. R. Norman. Verified by S. B. Ruth, Tuskegee Institute, Alabama. Museum of Vertebrate Zoology, Berkeley, number unknown, and B. R. Norman personal collection, 008 and 017. Based on visual characteristics, the two specimens collected in 1977 are approximately 80% *T. s.*

concinnus and 20% *T. s. pickeringi* (S. B. Ruth, personal communication), and were collected in an area naturally uninhabited by *T. s. concinnus*. The third specimen, collected in 1978, seems to exhibit characteristics nearer to *T. s. pickeringi* and lacks the substantial red-orange on the dorsal head that is present in the 1977 specimens. These may be accidental intergrades due to human introduction of *T. s. concinnus* since the nearest locality for this subspecies is calculated to be in Lewis Co., WA (Stebbins, 1966, A Field Guide to Western Reptiles and Amphibians, Houghton Mifflin Co., Boston).

Submitted by B. R. NORMAN, 820 West Fourth Avenue, Olympia, Washington 98502. ●

TYPHLOPS VERMICULARIS (Vermiform Blind Snake) ASIA: IRAN: Tehran: Siah sang (10 km N Rudehen). 30 May 1978. H. -H. Schleich. Zoological State Collection, ZSM 293/1978. Range extension of 50 km E old record at Tehran (Schleich. 1977. Herp. Rev. 8(4):126-129). Ranges from Yugoslavia to Albania, Bulgaria, Greece, Turkey, Syria, Israel, Egypt, USSR, Afghanistan and Iran (Leviton and Anderson. 1970. Proc. Calif. Acad. Sci. 38(10):163-206).

Submitted by H. -H. SCHLEICH, Dept. of Herpetology, Zoological State Collection, Munich, West Germany (BRD). ●

ADDITIONAL RECORDS OF SALAMANDERS OF THE *Ambystoma jeffersonianum* COMPLEX FROM ONTARIO, CANADA

All four species of the *Ambystoma jeffersonianum* complex (Uzzell 1964) are known to occur in Ontario (Weller and Sprules 1976; Weller, Sprules, and Lamarre 1978; Weller and Menzel, *in press*). Recent collecting has demonstrated that *A. jeffersonianum*, *A. platineum*, and *A. tremblayi* are more widely and continuously distributed than had previously been known. Species of this complex cannot be clearly distinguished on the basis of morphology alone. The ploidy, therefore, was determined by erythrocyte nucleus size (Weller, Sprules, and Lamarre 1978), and by counting chromosomes (karyotyping).

This paper reports these new localities, and the geographic significance of these records. The order of localities corresponds to the north south progression of solid circles in Figure 1. NMC refers to National Museum of Natural Sciences, Ottawa, Ontario; and, ROM, to Royal Ontario Museum, Toronto, Ontario.

AMBYSTOMA JEFFERSONIANUM (Jefferson salamander). York Co, 6.4 km NE Nobleton (43° 57'N 79° 36'W). 27 April 1978. J. Lovisek and G. Davis. ROM 10304; 1 specimen. Verified by W. F. Weller from erythrocyte nucleus size and morphology: Peel Co, 4.6 km E Belfountain (43° 47'N 79° 57'W). 21 April 1978. D. Servage. Identified by collector by obtaining diploid larvae from a large cluster of eggs: Regional Municipality of Hamilton-Wentworth, 4 km W Dundas (43° 14'N 79° 59'W). 5 April 1978. B. Mackenzie. One specimen (male), returned to pond. Verified by W. F. Weller from erythrocyte nucleus size and morphology. These records extend the known range by 44 km to the north (Figure 1).

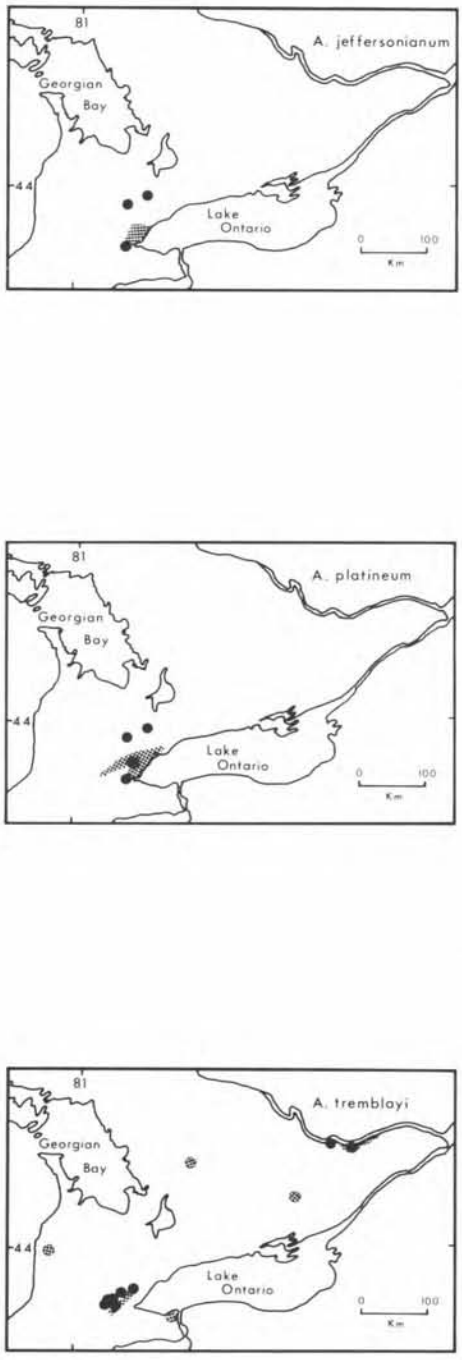


Figure 1. Distribution of *Ambystoma jeffersonianum*, *A. platineum*, and *A. tremblayi* in Ontario, Canada. Stippled areas denote the previously known range; solid circles represent localities reported in this paper.

AMBYSTOMA PLATINEUM (Silvery salamander). York Co, 6.4 km NE Nobleton (43° 57'N 79° 36'W). 27 April 1978. J. Lovisek and G. Davis. ROM 10305; 1 specimen. Verified by W. F. Weller from erythrocyte nucleus size and morphology. Peel Co, 4.6 km E Belfountain (43° 47'N 79° 57'W). 23 April 1978. D. Servage. DS 0038, 0073-75; 4 specimens. Verified by collector from karyotype and morphology. Halton Co, 1.2 km S and 3.2 km E Campbellville (43° 29'N 79° 57'W). 11 April 1978. D. Servage. DS 0020; 1 specimen. Verified by collector from karyotype and morphology. Regional Municipality of Hamilton-Wentworth, 4 km W Ancaster (43° 14'N 79° 59'W). 7 and 11 April 1978. B. Mackenzie. Six specimens, returned to pond. Verified by W. F. Weller from erythrocyte nucleus size and morphology. These records extend the known range northward by 44 km (Figure 1).

AMBYSTOMA TREMBLAYI (Tremblay's salamander). Regional Municipality of Ottawa-Carleton, Fitzroy Harbour (45° 28'N 76° 13'W). 21 and 22 August 1978. W. F. Weller and T. N. Tobias. NMC 18333; 18 specimens. Verified by W. F. Weller from erythrocyte nucleus size and morphology. Regional Municipality of Ottawa-Carleton, Britannia Filtration Plant, city of Ottawa (45° 22'N 75° 48'W). 29 April 1978. S. Darbyshire. DS 0079-89; 11 specimens. Verified by D. Servage from karyotype and morphology. Halton Co, 1.2 km S and 3.2 km E Campbellville (43° 29'N 79° 57'W). 11 April 1978. D. Servage. DS 0021; 1 specimen. Verified by collector from karyotype and morphology. Wellington Co, 1.7 km W Aberfoyle (43° 28'N 80° 10'W). 6 April 1978. D. Servage. DS 0030; 1 specimen. Verified by collector from karyotype and morphology. Waterloo Co, Cambridge (43° 22'N 80° 20'W). 19 April 1977. G. R. Francis and C. A. Campbell. Two specimens, unavailable for examination. Verified by W. F. Weller from erythrocyte nucleus size and morphology. Waterloo Co, Cambridge, Beake Pond (43° 19'N 80° 21'W). 4 May 1977. T. N. Tobias. Three specimens, unavailable for examination. Verified by W. F. Weller from erythrocyte nucleus size and morphology. Waterloo Co, Branchton (43° 18'N 80° 17'W). 1 May 1977. C. A. Campbell. One specimen, unavailable for examination. Verified by W. F. Weller from erythrocyte nucleus size and morphology. Waterloo Co, 0.9 km N and 1.7 km E Ayr (43° 19'N 80° 26'W). 21 April 1978. D. Servage. DS 0035, 0036, 0039-45; 9 specimens. Verified by collector from karyotype and morphology. These records indicate that this species is more widespread in the areas of western Lake Ontario and eastern Ontario (Figure 1).

Specimens in the private collection of D. Servage (DS) are destined for the herpetological collection of the Royal Ontario Museum. We thank Ontario Hydro for

permission to publish their record of *A. tremblayi* from Fitzroy Harbour.

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Rhadinaea montecristi MERTENS: AN ADDITION TO THE SNAKE FAUNA OF HONDURAS

A recent collecting trip to Honduras produced a single specimen of *Rhadinaea montecristi* Mertens, 1952, which represents a new record for that country. It is otherwise known from a series of specimens from the type locality, Hacienda Monte Cristo, 2200 meters elevations, mountains of Metapán, Depto. Santa Ana, El Salvador (Myers, 1974).

The Honduran specimen (LSUMZ 36594) was collected on 14 April 1978 and came from a locality locally known as El Portillo de Ocotepeque, 20.1 km E Nueva Ocotepeque, Depto. Ocotepeque, at a point where the Carretera Occidente crests the Sierra de Merendón. The specimen came from beneath a log in a pasture on a hill above the road at an elevation of 2010 meters. This spot was illustrated by Meyer (1969). The original vegetation of the area was closed canopy cloud forest (Lower Montane Moist Forest formation of Holdridge, 1967), now existing in restricted patches on the more inaccessible areas at this locality. The Honduran locality for *R. montecristi* is approximately 31 km E of the type locality in El Salvador.

The specimen is a male exhibiting the following characteristics: ventrals, 157; anal plate divided; subcaudals, 84; dorsal scale rows 19-19-19; supralabials 8-8 (4th and 5th entering orbit); infralabials 8-8 (4 in contact with anterior chin shields, 5th the largest); loreal 1-1; preocular 1-1; postoculars 2-2; temporals 1+2; total length, 401 mm; tail length, 125 mm; relative tail length, 0.312. The color pattern of the Honduran specimen is in agreement with the composite description given by Myers (1974) for the specimens from El Salvador. The color pattern in life was as follows: dorsum rust brown to row 4; a weakly differentiated blackish vertebral line on the middorsal scale row; black dorsolateral stripe on the lower one-third of row 4, all of row 3 (except for the dorsal apex, upon which there is a white spot), and the upper two-thirds of row 2; black lateral stripe on lateral edges of ventrals and lower one-third of row 1; area between dorsolateral and lateral stripes cream; dorsum of head rust brown; supralabials and eye stripe pale yellow, borders of those areas black; chin pale yellow grading to golden yellow on the throat and remainder of venter.

Herpetofaunal associates of *Rhadinaea montecristi* at this cloud forest locality include: *Bolitoglossa dunni, Bufo coccifer, Hyla salvadorensis, Plectrohyla guatemalensis, Ptychohyla spinipollex, Barisia moreleti, Anolis sminthus, Sceloporus malachiticus, Leptophis modestus, Ninia attrata, Rhadinaea godmani, R. kinkelini, Thamnophis cyrtopsis, Bothrops bicolor, B. godmani* (Meyer and Wilson, 1971, 1973; Wilson, McCranie, and Porras, 1978, *in press*; Wilson and Meyer, *in press*). Of particular interest in this list are the two other species of *Rhadinaea, godmani* and *kinkelini*. Occurrence of three species of *Rhadinaea* in syntopy is limited, although several examples of two-species syntopy are known (Myers, 1974). *Rhadinaea godmani, R. kinkelini,* and *R. montecristi* are already known to occur syntopically at Hacienda Monte Cristo on Cerro Monte Cristo in El Salvador (Myers, 1974). These three species are all members of the *godmani* group. Other examples of three species syntopy include: (1) *R. hesperia, R. omiltemana,* and *R. taeniata* at Chilpancingo, Guerrero, México; (2) *R. decorata, R. gaigeae,* and *R. marcellae* in the Xilitla region, San Luis Potosí, México; (3)*R. decipiens, R. decorata,* and *R. guentheri* at La Lola, Prov. Limón, Costa Rica; (4) *R. calligaster, R. decipiens,* and *R. pulveriventris* on Cerro Pando, Prov. Bocas del Toro, Panamá. In only the second example are the three species members of the same species group (the *decorata* group). At El Portillo de Ocotepeque, *R. kinkelini* was first collected in 1968, *R. godmani* in 1976, and *R. montecristi* in 1978. It is unlikely that any additional species of *Rhadinaea* will be collected at this locality.

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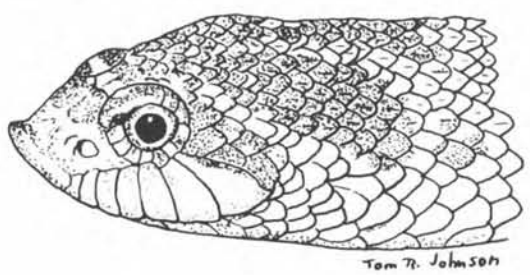
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Herpetological Husbandry

NOTES ON THE REPRODUCTION OF THE MUSSURANA, *Clelia clelia* (Daudin)

Neotropical ophidian reproduction is poorly documented and fragmentary. Fitch (1970) includes nothing on *Clelia clelia*, a relatively common and widespread form. On 1 March 1972 an emaciated *Clelia clelia*, of unknown origin, was received at Max Allen's Zoological Gardens, Eldon, Missouri, and maintained in isolation from other snakes. On 14 January 1975 she initiated egg laying, depositing two eggs. Another egg was deposited 15 January, however, complications developed and the snake died 17 January. Dissection revealed nine additional, undeposited eggs. Unfortunately the eggs were accidentally exposed to non-optimal temperatures during incubation and any potential development was precluded. The specimen measured 199.0 cm. after preservation.

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SECOND-GENERATION CAPTIVE RHINOCEROS IGUANA HATCHED

In October 1975, the new Parque Zoologico Nacional successfully hatched 7 Rhinoceros iguana, (*Cyclura cornuta cornuta*), the first time they have had captive reproduction in the zoo of this species.

In June 1978, two females of this group nested, laying within a day of each other, 12 and 15 eggs respectively. The eggs were removed from the exhibition area and placed in an incubator at 31°C. The first iguanas began to break their shells on 7 September, and all hatched between the 8th and the 15th of the month. The incubation period was from 81 to 87 days for both clutches. Out of 144 *Cyclura* eggs laid this year, 115 are of *C. c. cornuta* and 29 are of Ricord's iguana (*C. ricordi*).

At the time of writing, 55 Rhinoceros and 11 Ricord's iguana are successfully hatched. A remaining 27 are still incubating, of which a majority are expected to hatch. Thirty-nine eggs have been lost due to fungus infections, and 12 proved to be infertile. At present, all hatchlings are doing well.

Both species live sympatrically in xerofitic (sic) areas of the Dominican Republic and are threatened by competition with hervivorus (sic) livestock, predation by introduced animals and capture for human consumption and commercial trade locally.

. . . from AAZPA Newsletter, 19(12): 13. 1978.

SUCCESSFUL CAPTIVE REPRODUCTION OF YELLOW ANACONDAS

On 23 September 1978, six young Yellow anacondas were discovered in the large constrictor display at the Ellen Trout Zoo, where the adults have been housed since their arrival at the zoo two years ago. Also in the exhibit were six infertile eggs and one individual born dead. Breeding was not observed, so the gestation period is not known. The adults had been observed in "serpentine entanglement" in the fall of 1976; however, no young resulted from this mating.

. . . from AAZPA Newsletter, 19(12): 12. 1978.

CUBAN CROCODILES HATCH

On 9 June, a nest was constructed by the female Cuban crocodile with alfalfa hay provided for that purpose and 19 eggs were laid at the California Alligator Farm. These eggs were set up in various mediums; some left in the nest, some in Vermiculite in a styrofoam container in the snake house, some in damp paper in a crock in the snake house and some in Vermiculite placed in a dead air type poultry incubator, held at 87°. The latter proved successful after 86 days, and three Cuban crocodiles were hatched on Labor Day.

The hatchlings are doing well accepting crickets, pink mice, cut beef and cut liver.

. . . from AAZPA Newsletter, 19(12): 12. 1978

Book Reviews

A HERPETOLOGICAL COOKBOOK: HOW TO COOK AMPHIBIANS AND REPTILES. By Ernest A. Liner. 60p. Privately printed May 20, 1978. Available from Ernest A. Liner, 310 Malibou Blvd., Houma, Louisiana, 70360. Price $5.50.

At last there exists a publication for those herpetologists who live, sleep, and EAT their work. The "jet set" now has nothing on the herpetologist who can serve dried iguana eggs instead of caviar at his next party (for those herpetologists who can afford to serve caviar in the first place).

At first reading I thought of this as one of those "cute" publications (such as *Herpervertological Review*), but, on closer examination, I found that there are some sound recipes contained within. While some did not (and still do not) sound like something very likely to come in contact with my buccal cavity, some appear to be very good. Being a barbeque fan, the barbequed rattlesnake (or any snake of acceptable size) appealed immediately, as did several of the turtle preparations. At the opposite end of the spectrum, the deep-fried Brandied *Amphiuma* will probably never be served in my house. (Liner's recipe calls for three tablespoons of cognac; three liters may be a more realistic amount.)

This publication contains 228 recipes, although 39 of these are preparations not directly dealing with amphibians and reptiles, and include sauces or gravies that enhance many of the recipes.

A few typographical errors were found (*i.e., the contents of the Turtle Goulash, page 53, are duplicated*), but these are minimal and do not detract from the overall work.

For those readers who like to try something different, for those herpetologists who have always wondered what to do with the many DOR *Terrapene* that dot our highways (be sure to use only the freshest!!), or for those herpetogourmets who will try anything, this is the book for you. My only complaint was the lack of caecilian or tuatara recipes.

JAMES L. KNIGHT, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

Legislative Alert

USFWS PROTECTED AMPHIBIANS AND REPTILES: AN UPDATE

The following is a list of the 81 amphibians and reptiles considered endangered (E) or threatened (T) by the United States Fish and Wildlife Service as of 30 September 1978. This list is derived from a similar one prepared by the USFWS and published in the Federal Register (1978, Vol. 43, no. 238), but has been reorganized and condensed for ease of use. Some taxa listed below are protected in geographic areas that comprise only a part of their total known range. Refer to the official USFWS list for this information.

AMPHIBIANS:

- Chinese Giant Salamander *Andrias d. davidianus* (E)
- Japanese Giant Salamander *Andrias davidianus japonicus* (E)
- Santa Cruz Long-toed Salamander *Ambystoma macrodactylum croceum* (E)
- Desert Slender Salamander *Batrachoseps aridus* (E)
- Red Hills Salamander *Phaeognathus hubrichti* (T)
- Texas Blind Salamander *Typhlomolge rathbuni* (E)

- Stephen Island Frog *Leiopelma hamiltoni* (E)
- Israel Painted Frog *Discoglossus nigriventer* (E)
- Golden Coqui *Eleutherodactylus jasperi* (T)
- Panamanian Golden Frog *Atelopus varius zeteki* (E)
- Houston Toad *Bufo houstonensis* (E)
- Monte Verde Toad *Bufo periglenes* (E)
- Cameroon Toad *Bufo superciliaris* (E)
- African Viviparous Toad *Nectophrynoides* sp. (E)
- Pine Barrens Treefrog *Hyla andersoni* (E)

REPTILES:

- Loggerhead *Caretta caretta* (T)
- Green Turtle *Chelonia mydas* (E/T)
- Leatherback *Dermochelys coriacea* (E)
- Hawksbill *Eretmochelys imbricata* (E)
- Atlantic Ridley *Lepidochelys kempi* (E)
- Pacific Ridley *Lepidochelys olivacea* (T)
- Galapagos Tortoise *Geochelone elephantopus* (E)
- Geometric Turtle *Geochelone geometrica* (E)
- Madagascar Radiated Tortoise *Geochelone radiata* (E)
- Angulated Tortoise *Geochelone yniphora* (E)
- Shortneck Tortoise *Pseudemydura umbrina* (E)
- South American Turtle *Podocnemis expansa* (E)
- South American Turtle *Podocnemis unifilis* (E)
- River Terrapin *Batagur baska* (E)
- Spotted Pond Turtle *Geoclemmys hamiltoni* (E)
- Asian Three-keeled Turtle *Geoemyda tricarinata* (E)
- Indian Sawback Turtle *Kachuga tecta tecta* (E)
- Burmese Peacock Turtle *Morenia ocellata* (E)
- Aquatic Box Turtle *Terrapene coahuila* (E)
- Indian Flapshell Tortoise *Lissemys p. punctata* (E)
- Cuatro Cienegas Softshell *Trionyx ater* (E)
- Indian Softshell *Trionyx gangeticus* (E)
- Peacock Softshell *Trionyx hurum* (E)
- Black Softshell *Trionyx nigricans* (E)

- American Alligator *Alligator mississippiensis* (E/T)
- Chinese Alligator *Alligator sinensis* (E)
- Apaporis River Caiman *Caiman crocodilus apaporiensis* (E)
- Broadsnout Caiman *Caiman latirostris* (E)
- Yacare *Caiman yacare* (E)
- American Crocodile *Crocodylus acutus* (E)
- African Slendersnout Crocodile *Crocodylus cataphractus* (E)
- Orinoco Crocodile *Crocodylus intermedius* (E)
- Morelet's Crocodile *Crocodylus moreleti* (E)
- Nile Crocodile *Crocodylus niloticus* (E)
- Philippine Crocodile *Crocodylus novaeguineae mindorensis* (E)
- Ceylon Mugger Crocodile *Crocodylus palustris kimbula* (E)
- Mugger Crocodile *Crocodylus p. palustris* (E)
- Cuban Crocodile *Crocodylus rhombifer* (E)
- Siamese Crocodile *Crocodylus siamensis* (E)
- Gavial *Gavialus gangeticus* (E)
- Black Caiman *Melanosuchus niger* (E)
- Congo Dwarf Crocodile *Osteolaemus tetraspis osborni* (E)
- African Dwarf Crocodile *Osteolaemus t. tetraspis* (E)
- Tomistoma *Tomistoma schlegeli* (E)

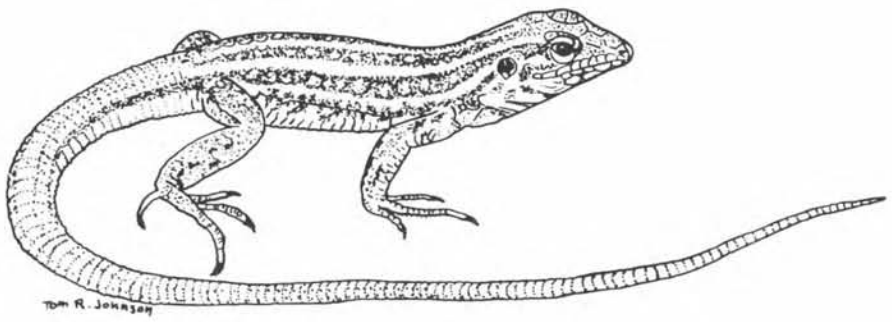
- Tuatara *Sphenodon punctatus* (E)

- Round Island Day Gecko *Phelsuma guentheri* (E)
- Day Gecko *Phelsuma newtoni* (E)
- St. Croix Ground Lizard *Ameiva polops* (E)
- Giant Anole *Anolis roosevelti* (E)
- Barrington Land Iguana *Conolophus pallidus* (E)
- Bluntnose Leopard Lizard *Crotaphytus silus* (E)
- Anegada Ground Iguana *Cyclura pinguis* (E)
- Mona Ground Iguana *Cyclura stejnegeri* (T)
- Island Night Lizard *Klauberina riversiana* (T)
- Bengal Monitor *Varanus bengalensis* (E)
- Yellow Monitor *Varanus flavescens* (E)
- Desert Monitor *Varanus griseus*
- Komodo Island Monitor *Varanus komodoensis* (E)

- Puerto Rican Boa *Epicrates inornatus* (E)
- Mona Boa *Epicrates m. monensis* (T)
- Jamaican Boa Epicrates subflavus (E)
- Indian Python *Python m. molurus* (E)
- Eastern Indigo Snake *Drymarchon corais couperi* (T)
- Atlantic Salt Marsh Snake *Nerodia fasciata taeniata* (T)
- San Francisco Garter Snake *Thamnophis sirtalis tetrataenia* (E)
- New Mexico Ridgenose Rattlesnake *Crotalus willardi obscurus* (T)

SSAR members are advised that the above list represents only those amphibians and reptiles currently having an official USFWS status. Many additional herpetological taxa are controlled under other governmental agreements and conventions.

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As of March, 1978, approximately 87 searchers are scanning 450 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

Richard D. Worthington, Current Literature, Department of Biological Sciences, The University of Texas at El Paso, El Paso, Texas 79968

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Herpetological Review still remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the **Journal of Herpetology**—see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Manuscripts submitted **must** be typed, double-spaced, on 8½ X 11 paper, and should be sent in duplicate. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles may also be submitted. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of the unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

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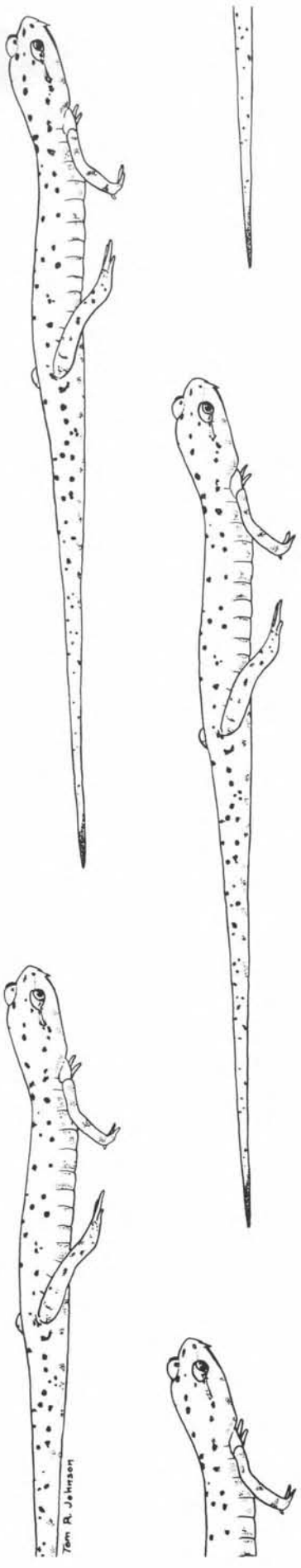
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Contents

SSAR Annual Meeting News 2
SSAR Business 3
Feature Articles
Observations of ant predation upon brooding salamanders, by D. Forester 3
An unusually patterned specimen of the gray-banded kingsnake, Lampropeltis mexicana alterna (Brown), by B. Tryon 4
A record of a breeding amelanic loggerhead turtle, by C. Limpus, K. Miller and E. McLachlan 6
Dicephalism in the African worm snake Leptotyphlops bicolor, by W. Branch 6
An inexpensive method of construction for enclosures and fences, by G. Middendorf 7
Sigma Xi grants-in-aid of herpetological reseach for 1977-78 7
Sources of amphibians for research. II. 8
Herpetological Husbandry
Record crocodile growth rate? 15
Black pine snakes hatch at Philadelphia Zoo 15
New reptile display at Cohanzick Zoo 15
Floating containers for rearing tadpoles, by D. Hoppe 16
Book Reviews
"Common Indian Snakes: A Field Guide" by Romulus Whitaker. Reviewed by M. Nickerson 16
"A Field Guide to Australian Frogs" by John Barker and Gordon Grigg. Reviewed by W. Duellman 17
"A Preliminary Account of the Rattlesnakes with the Description of Four New Subspecies" by Herbert S. Harris, Jr. and Robert S. Simmons. Reviewed by J. McCranie and L. Wilson 18
Regional Society News
The Australasian Affiliation of Herpetological Societies . . . 21
The Australian Society of Herpetologists 22
Legislative Alert
Animal dealer fined 22
Alligator smuggling investigation concluded 22
Proposition herptile 22
Geographic Distribution
New records 23
Herpetological records from Northwestern Oklahoma, by R. Lardie 24
New departmental records for reptiles and amphibians from Honduras, by L. Wilson, J. McCranie, and L. Porras 25
Two additions to the reptile fauna of Honduras, Eumeces managuae Dunn and Agkistrodon bilineatus (Gunther), with comments on Pelamis platurus (Linnaeus), by G. Cruz, L. Wilson, and J. Espinosa 26
News Notes 27
Current Literature 30
Advertisements 42

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SSAR Annual Meeting News

SSAR ANNUAL MEETING NEWS

The 22nd annual meeting of the Society for the Study of Amphibians and Reptiles will be held in conjunction with the 27th annual meeting of the Herpetologist's League at the University of Tennessee, Knoxville, Tennessee, from 12 to 16 August 1979.

PROGRAM SUMMARY:

Sunday, 12 August	Registration, SSAR Board of Directors Meeting, HL Board Meeting, Third Annual Regional Herp Society Conference (SSAR), Liaison Committee Meeting
Monday, 13 August	Contributed Papers, Iguanine Lizard Behavior and Ecology Symposium (SSAR), Social
Tuesday, 14 August	Contributed Papers, Iguanine Lizard Behavior and Ecology Symposium (SSAR), Captive Reptile and Amphibian Management Symposium (SSAR), Picnic, SSAR General Business Meeting
Wednesday, 15 August	Contributed Papers, Desmognathine Salamander Systematics Workshop (HL), HL Business Meeting
Thursday, 16 August	Contributed Papers, Salamander Mimicry Symposium (HL)

SPECIAL ACTIVITIES:

Herpetological Art Show and Crafts Show and Sale. Depending on interest: Spouse and family trips to Biltmore Mansion (Asheville, North Carolina); Gatlinburg, Tennessee; University of Tennessee Arboretum and the Museum of Atomic Energy, Oak Ridge, Tennessee. Daytime child care may be available if demand warrants it.

GENERAL INFORMATION:

Pre-registration forms, including call for papers and other information, will be mailed to members of the two societies in February. Copies of the meeting information will be sent on request to interested persons.

Housing in air-conditioned dormitories will be available.

Transportation: Individuals planning to travel by air should make reservations into McGee-Tyson Airport in Knoxville.

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Once again it is my pleasure to acknowledge those members who made financial contributions to the Society for fiscal 1978. Although some donations were only a dollar or so, others were substantial, but what is most important is that so many members were willing to contribute and the $1195 so obtained formed a healthy part of our total income.

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Observations of Ant Predation Upon Brooding Salamanders

The role of brooding behavior as an antipredator device has been discussed for three plethodontid salamanders: Plethodon cinereus (Bachmann, 1964), Aneides aeneus (Snyder, 1971), and Desmognathus ochrophaeus (Forester, 1974). In the latter study, females were subjected to multiple encounters with known or suspected vertebrate and invertebrate predators. Attending females were uniformly aggressive to all predator classes, although there was a significant inverse correlation between successful clutch defense and predator size.

The purpose of this note is to present a striking exception to the above correlation and to document predation by the red ant Lasius subumbratus upon Desmognathus ochrophaeus females and their eggs.

During the summer of 1973, I was conducting a field study pertaining to the adaptiveness of parental care in the mountain dusky salamdner, D. ochrophaeus. The study site was along a slow-moving mountain stream near the town of Highlands, North Carolina.

In late June, shortly after the onset of oviposition, I located 30 attending females and independently confined each with its eggs in a 9 cm plastic petri dish (Fig. 1-A). The lid of each dish contained four 3 mm ventilation holes. Each dish containing a confined female and her clutch was placed under a piece of moss at the exact location of her natural nesting cavity.

The eggs of each clutch were counted at six day intervals to determine the weekly mortality rate of attended eggs in the absence of predation. At the onset of the experiment (June 21, 1973), the $\bar{x}$ number of eggs/clutch was 18.39. On August 8 (the eighth check), the $\bar{x}$ number of eggs/clutch had decreased to 15.81. Hatchlings were beginning to emerge from many of the clutches. On August 14, I returned for the ninth check. Twenty-seven of the 30 dishes contained females and larvae. Three dishes (7-9) each contained well over 100 ants. In each case the eggs were missing and all that remained of the female was a skeleton (Fig. 1-B).

I placed masking tape over the ventilation holes of one of the dishes to prevent the ants from escaping. I then returned to the Highlands Biological Station where I confined a living female in the ant-infested dish. Within five minutes the female was dead.

There can be no doubt that predaceous ants represent a potential threat to brooding females and their

eggs, but the frequency with which such encounters occur remains unclear. In nature, attending salamanders and their eggs are localized along the margins of streams and thus could be easily located by searching ants. However, since all three of the confinement dishes entered by the ants were situated in close proximity to one another (20-80 cm apart), and since ants did not enter other dishes located up and down stream, it is likely that the recorded predation was the result of chance discovery and the inability of the female to escape from the dish.

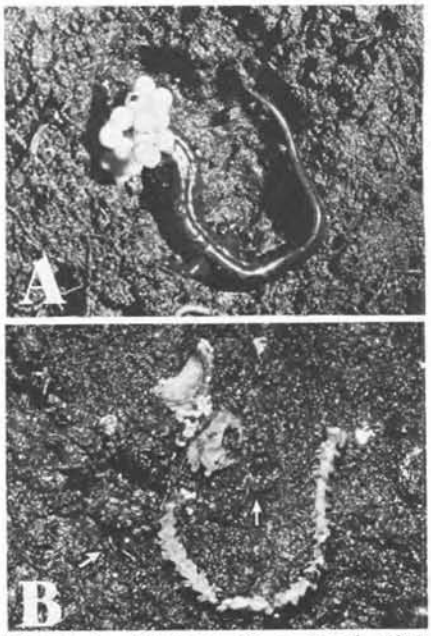


Figure 1. Closeup of a petri dish containing: (A) an attending female and her eggs; (B) the skeletal remains of a female consumed by predaceous ants (arrows indicate the location of ants).

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An Unusually Patterned Specimen of the Gray-Banded Kingsnake, Lampropeltis mexicana alterna (Brown)

Descriptions of aberrations in the color patterns of a variety of North American snake genera have appeared in the literature. Anomalous features have been most frequently reported for the genus Crotalus (Gloyd, 1935, 1958; Klauber, 1972; Nickerson and Mays, 1968), but genera such as Agkistrodon, Elaphe, Lampropeltis, Pituophis, Thamnophis and others have been shown to include specimens with color or pattern deviations (Gehlbach, 1962; Gloyd, 1958; Hensley, 1959; Fitch, 1959). Many examples previously recorded have been albinistic or melanistic (Hensley, 1959; Klauber, 1972), but occasional specimens are found with stripes replacing the normal blotched pattern or some other pattern defect. Fitch (1959) described specimens of Agkistrodon contortrix which were completely devoid of dorsal pattern.

Atypical color or patterns have been reported for three species of the genus Lampropeltis. Blanchard (1921) and Ashton (1973) reported striped examples of the normally blotched L. c. calligaster, and Blaney (1977) reviewed earlier accounts of abnormally patterned L. getulus. Williams (1978) discussed various anomalies in L. triangulum, including an albino specimen of L. t. triangulum (Condit and Woodruff, 1955), and an aberrant specimen of L. t. celaenops possessing deviations in both color pattern and scutellation (Gehlbach, 1962). Williams (1978) also noted specimens of L. t. triangulum and L. t. annulata with tendencies toward partial striping.

Although it is a species prone to extreme variability (Gehlbach, 1967; Gehlbach and Baker, 1962; Tanzer, 1970; and others), previous reports of atypically colored or patterned specimens of the gray-banded kingsnake, L. mexicana alterna are unknown in the literature; however, Frank Retes (personal communication) reported an individual with dorsal striping. This paper describes an unusual specimen of this form.

The specimen, a male blairi phase (Tanzer, 1970) L. m. alterna (total length 281 mm, tail length 38 mm, weight 10.9 g at hatching) hatched 25 August 1977 as the result of a captive breeding between two typically patterned blairi phase kingsnakes. Both were collected near Langtry, Val Verde Co., Texas, September, 1972 (male) and June, 1973 (female). From a total of sixteen hatchlings from this pair (described, in part, by Murphy et al., 1978) and eighteen additional hatchlings from the female, this was the single obvious anomaly. The male parent (UTA-R7188) is in the vertebrate collection of The University of Texas at Arlington. The female and the presently described specimen are being maintained alive in the collection of the author. I am indebted to J. S. Dobbs and Dennis W. Herman for depositing specimens for my use. James B. Murphy kindly read and commented on the manuscript.

Visually, the specimen is quite striking. Overall coloration is that of a light blairi morph with an infusion of black pigment. The head and snout are black, lower labials dark gray lightening to medium gray on the throat. The iris is dark brown and the tongue is black. The venter is black but gray patches invade the length of the body and tail slightly from both sides. A black stripe 4-6 scales wide connects to the parietals middorsally and extends to the left where it widens irregularly to the right and splits where red pigment begins.

Anteriorly, the majority of red is confined laterally to the left. The first series of normal bands are replaced by a red stripe 2-14 scales wide extending 33 percent of the total length from the ventrals to the sixth scale row. This stripe is expanded in four areas but in only three does red pigment extend across the middorsal line. Wide areas of black outline all red areas of the striping, but in the first and second expansion, the black extends as a band dorsolaterally to the right side of the ventrals. Irregular black blotches (2-4 scales) are present in gray interspaces posterior and anterior to these black bands, giving the impression of alternating markings and perhaps indicating where normal banding should occur.

The second and third bands are joined laterally on the left as are the fifth and sixth bands. Red scales are present in these bands, but in only the second does red pigment cross middorsally. The fourth and bands seven through twelve are single. In the fifth band, red scales are restricted laterally to



Fig. 1. Atypically patterned Lampropeltis mexicana alterna hatched 25 August 1977.

the left, while in the remaining body bands, red scales extend dorsolaterally to the right but remain generally restricted laterally to the left. There are four black tail bands, the first of which contains red scales. The tail tip is black. On the left, in addition to the first black band anteriorly, black bands extend dorsolaterally to the ventrals in the second, fourth, fifth, sixth, seventh, eighth, and tenth through twelfth bands. All black areas dorsally and laterally, including the irregular blotches anteriorly, are outlined with 1-2 scales of white.

Overall, the entire pattern appears shifted to the left (Fig. 1). Therefore, if viewed from the left, the specimen appears as an atypical blairi morph, and from the right, with a reduction of red pigment, it bears a strong resemblance to the alterna morph of L. mexicana alterna.

Scutellation, however, is quite normal and all counts fall within the range for blairi and alterna morph L. m. alterna (Gehlbach, 1967; Gehlbach and Baker, 1962). Ventrals are 217, subcaudals 62, and dorsal scale rows immediately anterior to the anal plate are 25, 27, and 19, respectively. Upper labial counts are 7, and lower labials number 10 for both sides. Preocular-postocular counts are 1-2 on the left and 1-3 on the right. Possible skeletal abnormalities were not determined, although feeding and other normal activities were not restricted.

Although the deviation from pattern symmetry and the apparent assumption of blairi and alterna affinities on the left and right, respectively, is interesting, this comparison is in no way intended to imply that this specimen is an intermediate. So called intermediate specimens have been described previously (Gehlbach and Baker, 1962; Tanzer, 1970) on the basis of such characteristics as length and width of the nuchal blotch or band, the degree of or the absence of red (or orange) pigmentation, the number of major body bands, and the presence or absence of alternating markings between major body bands. It can be seen, however, with the present number of specimens available for study, that certain of these characters do not, as once throught, indicate particular affinities. For example, alternating markings can no longer be used to affirm alterna morph affinities, as successive captive-breedings of blairi morph specimens possessing dorsal alternating markings have failed to produce alterna morph snakes. In addition, alterna phase specimens are known with few or no alternating markings from certain parts of their range. Variations of a single character should rarely if ever be used to determine affinities, particularly when few specimens are available.

It is unfortunate that many of the previously reported "aberrant" specimens were determined so on the basis of a single anomalous character (i. e., melanism, color of stripes or bands, striping instead of blotching, etc.). In some cases, these early reports were later shown to be typical of a population within a certain range (Blaney, 1977). In others, as in the described specimen, it is nothing more than the atypical individual that may appear sooner or later in any given population.

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A Record of a Breeding Amelanic Loggerhead Turtle

Albinism has been reported infrequently among sea turtle hatchlings (Chelonia mydas (L.): Bustard, 1972; Carr, 1967; Harrison, 1963. Caretta caretta (L.): Hughes, 1974). However, neither these authors nor Gilboa and Dowling (1974) make any reference to albino adult sea turtles.

An amelanic loggerhead turtle, Caretta caretta, was observed nesting on Wreck Island, south Great Barrier Reef, Queensland, Australia. Carapace measurements over the curve were: midline length 101 cm, maximum width 91 cm ($\bar{x}$ mature female C. caretta curved carapace length = 96 cm, range 80-112 cm). The scutes of the carapace, plastron and head were yellowish, while the skin was white, although when first seen, the thick algal coating obscured much of the carapace coloration. It was observed laying on 23 December 1977 and 20 January 1978. On the latter date, the clutch size was 109 eggs. Six eggs from this clutch were returned to the laboratory for incubation and four hatched, giving normally pigmented young.

At nearby Mop Repos rookery on mainland south Queensland, loggerhead turtles have been the center of research for ten summers. There, no amelanic hatchling has been found among over 73,000 hatchlings examined on the beach. However, examination of the nests from which these hatchlings emerged occasionally revealed amelanic embryos and/or hatchlings remaining after the emergence of normally pigmented siblings. Albinism in these instances was usually associated with varying degrees of deformity of the carapace and/or head. The amelanic embryos often lacked the caruncle, and so could not cut their way from the eggs, where they would thus die. Amelanic hatchlings were usually smaller and less active than normal and all those found via nest excavation were expected to die in the nest.

That an amelanic turtle should emerge from the nest is unusual. That such a turtle survived to reproductive maturity in the wild seems remarkable. This is the only amelanic turtle recorded among approximately 5,400 nesting loggerhead turtles and 300 others (immatures to adults) tagged in eastern Australia within the Queensland Turtle Research Project since 1968.

The normally pigmented offspring suggest a mating with a normally colored male and indicate that amelanism in this species is a recessive character. Further, it would appear that normal coloration is not a necessary cue for female recognition by the courting male loggerhead turtle.

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Dicephalism in the African Worm Snake Leptotyphlops bicolor

Dicephalism is a rare form of abnormality, but because of its bizarre nature is one that usually commands public attention. Two-headed snakes have been known since the time of Aristotle, although Cunningham (1937) was the first to study the pathology in depth, compiling a list of over 80 cases, of which no less than 33 were from the colubrid genus Natrix. Since his exhaustive study, additional examples have been described at infrequent intervals in the literature (Vanzolini, 1947; Shaw and Campbell, 1974; Davies, 1974). Klauber (1956), as he did with all other aspects of the biology of rattlesnakes, thoroughly reviewed the occurrence of dicephalism in the group.

The vast majority of dicephalic reptiles have been reported from North America and Europe, with very few examples coming from Africa (Broadley, 1972). However, this is unlikely to represent regional differences in the frequency of the abnormality, but rather, reflects the prevalence of herpetologists in these areas!

While reviewing Nigerian Leptotyphlops housed in the British Museum (Natural History) collections, I discovered a two-headed specimen of Leptotyphlops bicolor. Although collected in 1938, to my knowledge the existence of this specimen has not previously been noted. It is of interest in representing the first record of dicephalism in a scolecophidian, while the size of the specimen suggests that it must have survived for some time after hatching.

The snake (BM 1938.3.1.77) was collected at Lokoja, Kobba Province, Southern Provinces, Nigeria, by J. H. Pasqual, and has two perfectly formed heads, of almost equal size (Fig. 1). The right head (when viewed from above) forms a continuous axis with the main body, from which the left head protrudes at almost 90^0. The heads are of equal width, but the left head is slightly shorter (5 mm) than the other (6.8 mm). All details of scutellation for both heads are as for typical bicolor (Villiers, 1975), with the exception that the first and second supralabials are fused on the right side of the left head. Including the rostral, the right head has 19 dorsals to the point of fusion, compared with 16 dorsals along the left head. Posterior to the fusion, there are 240 dorsals, 9 subcaudals, and a terminal spine. The scales are in 14 rows at mid-body, and the snake measures 91 mm from the snout of the right head to the terminal spine. On the ventral surface, 76 dorsals from the tail tip, two ventrals are split in the mid-line, and may represent the remains of the umbilical scar.

Villiers (1975) lists the average length of L. bicolor as 125-150 mm, although Leston and Hughes (1968) record a female of 187 mm from Tafo, Ghana. Eleven specimens from Nigeria in the BM collection range in length from 72-171 mm.

Although the majority of two-headed snakes die at or shortly after birth, others survive for some time. Because of its size, the dicephalic L. bicolor, although not an adult, is unlikely to be a hatchling, and must presumably have survived, fed and grown for some time after hatching. Captive two-headed snakes have occasionally survived for long periods, and perhaps the most famous of these was "Dudley Duplex", a California king snake (Lampropeltis getulus) that survived for six and a half years at San Diego Zoo (Shaw and Campbell, 1974). However, Leptotyphlops are specialized fossorial termite-eaters, and it is intriguing to wonder how a two-headed fossorial snake could successfully search for food in the wild.

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Fig. 1. A dicephalic Leptotyphlops bicolor (BM 1938.3.1.77) from Lokoja, Nigeria.

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An Inexpensive Method of Construction for Enclosures and Fences

Most enclosures and fences used by herpetologists have been constructed using either lengths of hardware cloth topped by a second horizontal piece or lengths of galvanized metal sheeting (Medica et al., 1971; Lotter, 1975). While such structures have the advantage of imperviousness to weather and are durable over long periods of time, the disadvantages of high initial cost and difficult construction often preclude use, especially by less affluent herpetologists. However, another type of fence can be constructed cheaply and easily, and is both fairly resistant to weather and sufficiently durable for most studies.

The fence is constructed of clear polyethylene plastic approximately 10 mils thick. Although it is easier to purchase the plastic in precut widths, I found it much cheaper to buy it in larger widths and cut it myself. The fence is supported by 1" x 2" pine stakes commonly used as highway markers. Both the stakes and plastic may be purchased from most lumber retailers.

The stakes are hammered into the ground wherever the fence is to be located. The plastic is stretched between the stakes and stapled directly to them. I found it useful to place a piece of electrical tape on top of the plastic adjacent to the stake and then staple through the tape; this gives added support at stapling points. The bottom of the plastic is then either buried to the desired depth or laid flat on the ground and covered with rocks and dirt.

This type of fencing is useful for drift fences and enclosures. It will also prove very useful for those working in remote areas since it is considerably lighter than metal. The facing will last a reasonable time with only minor maintenance. I found the electrical tape useful for repairing rips, and only occasionally found it necessary to replace sections. With only minor repairs, the fencing will last many months, but continued exposure to thermal extremes will effect the plastic's resiliency, a problem I especially noted after 18 months. Black polyethylene is more susceptible to this; in addition, the clear plastic is much less noticable. The approximate cost for this type of fencing is less than 10 cents per running foot.

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SOURCES OF AMPHIBIANS FOR RESEARCH, II.

The frequent requests for a wide variety of amphibian species and the absence of a clearinghouse for information on sources of amphibians led to the publication in 1971 of a list of suppliers (Nace, Waage, and Richards, 1971). The ink was not dry before that list required amendments. Now, six years later, the renewed press of inquiries leads us again to publish such a list. Several attempts were made to contact each source on the previous list, and only those who reported they were active as of October 1977 appear here. The original list cited 59 sources. This new list cites 64, but of these only 27 were on the original list. The first list named sources for 144 species; this list names 195 species.

These statistics might suggest that although sources change, the supply of amphibians is fairly constant. This, however, would be an incorrect conclusion: there have been many changes in amphibian supply during this six-year period.

Dominating the period was a marked change in the availability of animals in the leopard frog group. In the early 1970s, virtually all leopard frogs used in teaching (13,000,000) and research (2,000,000) (Nace, 1970; Gibbs, Nace, and Emmons, 1971) were captured in the wild. Now, nature no longer can meet the need (Nace, Culley, Emmons, Gibbs, Hutchison, and McKinnell, 1974; Wake et al., 1975; unpublished NIH conference of 1975). Thus, one commercial supplier (Emmons, personal communication) reports that in 1970-71 they processed over 10 *tons* of leopard frogs from one western state alone, whereas in 1974-75, less than 250 *pounds* of these frogs were available (Nace, 1976a). Even commercial frog catchers with 30-40 years of experience come up empty-handed (McKinnell, personal communication), and in a recent study of about 75 known breeding sites in Wisconsin, egg clutches were found at only five (Hine, Les, Hellmith, and Vogt, 1975). This reduction in the number of breeding sites was accompanied by reduced fertility rates for the eggs which were laid. During this same period a population near Ann Arbor, Michigan dropped from 85,000 leopard frogs to *zero* (Nace, 1977).

Such changes in commercially exploitable populations of leopard frogs have been widespread and apply equally to other anura throughout the world. How many species have been affected is unknown. The causes for these population declines seem to be multiple (Cooke, 1972) and although reports from commercial suppliers in the fall of 1977 suggest a stabilization of the situation, they do not signal an improvement. In the face of these circumstances, the laws of supply and demand have forced a rapid increase in commercial prices for frogs ($2.25 per dozen for 3-inch *Rana pipiens* in 1972 from one company compared with $10.00 in 1977 from another), a pressure to shift to new teaching organisms such as the fetal pig (Nace, 1976b), and domestically raised *Xenopus* (Eldridge, 1976), and, apparently, a sharp reduction in the exposure of students to live vertebrates.

A second change during this period has been the acquisition of the major family-enterprise commercial frog supply houses, whose proprietors were in personal contact with the frog catchers, by large suppliers of educational materials. This has been accompanied by reduced contact with the frog catchers. Even had the supply of frogs in nature remained unchanged, this new structure of the industry would have reduced the accessible supply of animals. Although many of the individuals have changed, a second category of suppliers remains constant. These are the investigators and "hobbyists" who are willing to share their resources with others. Among these, some are able to provide limited services gratis, whereas others, because of the demand and for institutional reasons, must charge for their services.

A third change during this period is evident in the research use of amphibians. Nace (1968, 1970, 1976a, 1976c) and Gibbs, et al., (1971) called for improvement in the quality of the amphibians used in research. This improvement was badly needed in the areas of systematic definition, disease, nutritional and genetic control, and in-house care of the animals (see Symposium, 1973). Concurrently, the changing status of many research areas including neurology (Fite, 1976, Llinás and Precht, 1976) and nuclear transplantation (McKinnell, 1978) has occasioned an increasing demand for amphibian models with genetic definition and genetic markers.

Important events in the improvement of amphibian standards have included work on the systematic definition of the popularly used leopard frogs. Because the reevaluation of the species in this complex by Pace (1974) is of great utility and importance to the potential users of this list of sources, her description and key to these species is reproduced here:

Rana pipiens Schreber

This is probably the most widely ranging member of the species complex. It is the only leopard frog known in Canada. In the United States it is found in New England, in New York and Pennsylvania, in most of Ohio and northern Kentucky, in northern and central Indiana, in northern Illinois, in Iowa and west to and through the Rocky Mountains. In the Far West it is found in the Snake River Valley, the Columbia River Valley, and in Lake Tahoe and other areas of California and Nevada. It is also found at higher elevations at least as far south as Alpine, Arizona, and may occur in at least the northern part of Mexico as well.

Rana utricularia Harlan

Found throughout most of the Atlantic Coastal Plain from southern New York and northern New Jersey and through the Gulf Coastal Plain to somewhere between Corpus Christi and Victoria, Texas. It is found in southern Missouri, southern Illinois, southwestern Indiana, most of Kentucky, and extreme southern Ohio. It is found in southeastern Kansas and eastern Oklahoma and is the only leopard frog known from Tennessee, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia and Delaware.

Rana berlandieri Baird

In the United States this species is known only from southern Texas. It is known from as far north as Johnson County, in central Texas, and San Patricio County, along the Gulf Coast. It may also occur west of the Pecos River (known from Ward County, Texas, whose western border lies along the Pecos River).

Rana blairi Mecham, Littlejohn, Oldham, Brown and Brown

Found in the central plains and prairie regions of the United States, from eastern Colorado, northeastern New Mexico, northern Texas, Oklahoma (except the southeastern third of the state), most of Kansas, part of Nebraska and Iowa, and in northern Missouri, central Illinois, and in scattered localities further east (western Indiana) and south (southern Illinois).

Key to Adult Males in the *Rana pipiens* Complex from the United States (from Pace, 1974)

1. Skin at angle of jaw overlying internal vocal sac not differentiated in texture or color from surrounding skin (may be somewhat stretched); no distinct white spots on centers of tympana; dorsolateral folds continuous and not displaced, usually wide and low, but discernible to the point where the leg joins the body; dorsal spots usually ringed with light coloration . . . . . *Rana pipiens*

1'. Skin at angle of jaw overlying internal vocal sac differentiated from surrounding skin in some way (e.g., texture or pigmentation); tympanal spots, dorsolateral folds, and dorsal spots variable 2

2(1'). Mullerian ducts absent, or specimen from Florida 3

2'. Mullerian ducts present and specimen from Texas. . . . *Rana berlandieri*

3(2). External vocal sacs large, spherical, apparently thin-skinned, lying loose at angle of jaw when not inflated or from Florida; dorsolateral folds usually continuous and not displaced . . . . . *Rana utricularia*

3'. External vocal sacs small, usually visible only because skin at angle of jaw is conspicuous when internal vocal sac is not inflated owing to texturings of the skin below the labial stripe; dorsolateral folds usually discontinuous and displaced medially. . . . . *Rana blairi*

It is unfortunate that no key is available for the females of these species. Also, please note that some systematists prefer *R. sphenocephala* to *R. utricularia*. Of additional importance is the recent work on the leopard frogs of the Southwest and Mexico by Frost and Bagnara (1976). However, few, if any, commercial suppliers are prepared to distinguish among any of these species of leopard frogs when they provide "*Rana pipiens*." Indeed, some suppliers attempt to meet demands with frogs imported from Europe, and this may not always be indicated on the packing slips. Thus, the

user is urged to exercise caution regarding the identity of amphibians used in research protocols (Bagnara and Frost, 1977).

Another event of importance in defining research amphibians and their use was the appearance of "Amphibians: Guidelines for the breeding, care and management of laboratory animals" (Nace et al., 1974). Although already out of date in some particulars, this document remains the best currently available source of information on the matters suggested by its title. Of particular note, it defines a nomenclature for a classification to permit investigators to select animals most appropriate to their needs, to communicate effectively with suppliers, and to accurately report their data. This nomenclature is reproduced here for the reader's convenience, but the reader is urged to become familiar with the definitions of these terms as given on pages 27-36 of the reference.

1. Wild
2. Wild-caught
   a. Wild-caught nonconditioned
      (1) Wild-caught nonconditioned nontreated
      (2) Wild-caught nonconditioned treated
      (3) Wild-caught nonconditioned miscellaneous
   b. Wild-caught conditioned
      (1) Wild-caught conditioned larvae
      (2) Wild-caught conditioned juveniles or adults
      (3) Wild-caught conditioned miscellaneous
3. Laboratory reared
   a. Laboratory-reared standard
   b. Laboratory-reared miscellaneous
4. Laboratory bred
   a. Laboratory-bred standard
   b. Laboratory-bred miscellaneous

Among laboratory-reared and laboratory-bred animals the following types of populations and lines may be designated:

(1) Random mating lines
(2) Heterozygous isogenic clones
(3) Heterozygous marked lines
(4) Mutant lines
(5) Inbred lines
(6) Gynogenetic diploid lines
(7) Homozygous lines
(8) Haploid animals
(9) Polyploid animals

Attention is also directed to Müller (1976) which on a comparative basis details many experimental parameters of concern to those using amphibians for research and describes the useful series of books on amphibian physiology represented most recently by Lofts (1976).

Among the sources cited in the following list, those marked with "§" are, at present, adhering to the conventions of this classification, and #39 is developing the capacity to do so.

The provision of animals with genetic definition or genetic markers is most advanced at the Axolotl Colony (#3) (Malacinski and Brothers, 1974), as might be expected from the long history of culture of the Mexican axolotl. Attention of the readers is drawn to the informative Axolotl Newsletter available from that resource. Other species for which there has been significant development of genetic definition are *Xenopus laevis* and *Pleurodeles waltlii*. Although at this time no specific sources can be cited for genetically defined stocks of these animals, they are available on occasion from the investigators using them. Among the ranids, the best stock of genetically significant animals is held by the Laboratory for Amphibian Biology, Hiroshima, (#27) and to a lesser extent by the Amphibian Facility.

A major problem in providing high-quality animals to users has been the inadequacy of the care in users' laboratories. Basic to this has been inappropriate housing. The development of housing units that would reduce labor and space costs, promote the health of animals, and be adaptable to a wide variety of species has been a major concern of the Amphibian Facility. Such units are now available and feature a highly adaptable enclosure (amphibians are not held in aquaria, terraria, cages, or pens) called the Michigan Environmental Enclosure for Small Animals (MEESA) and include an Adjustable Depth Overflow Pipe (ADOP). Figure 1 shows a two-enclosure model made of plastic and Figure 2 shows a six-enclosure unit made of stainless steel. The Amphibian Facility has recently been remodeled and animals are housed in these enclosures mounted on five-tier racks. If these enclosures are used, nearly all aspects of the environment may be controlled. The units are manufactured by Keyco Co. (P.O. Box 12, Peach Bottom, Pennsylvania, 17563, 717-548-2185, Mr. Howard Fricke, President) and are currently marketed by NASCO (#37). We also call the reader's attention to the new enclosures for bullfrogs developed by Culley (1977).

The Amphibian Facility continues to develop and provide laboratory-reared and laboratory-bred amphibians as research animals for the scientific community. As of October 1977, the colony is composed of over 10,000 living, postmetamorphic animals. This number is not sufficient to permit distribution of large quantities of adult animals to many investigators. However some adults can be provided on a selected basis, and tadpoles of almost any stage are available throughout the year. Arrangements can also be made for other services as described in a price list which may be obtained on request.

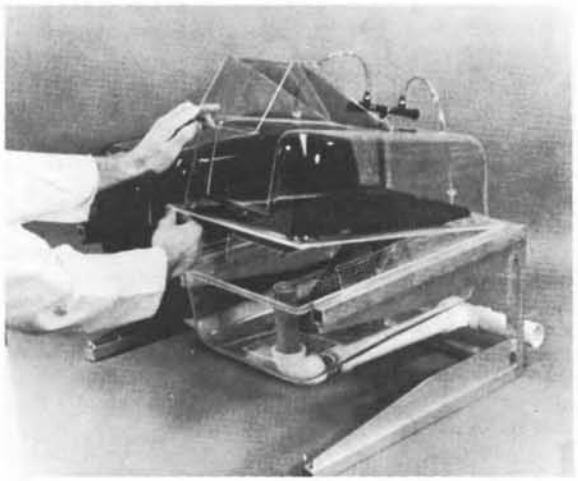


Figure 1. A two-enclosure table top, plastic model of MEESA suitable for carrying up to 150 mature *R. pipiens* for several weeks and 50 indefinitely in each enclosure. Modular units may be added. It can also house all other species of amphibians as well as fish, lizards, snakes, and small mammals or birds. Temperature, water, air flow, and light can be controlled.

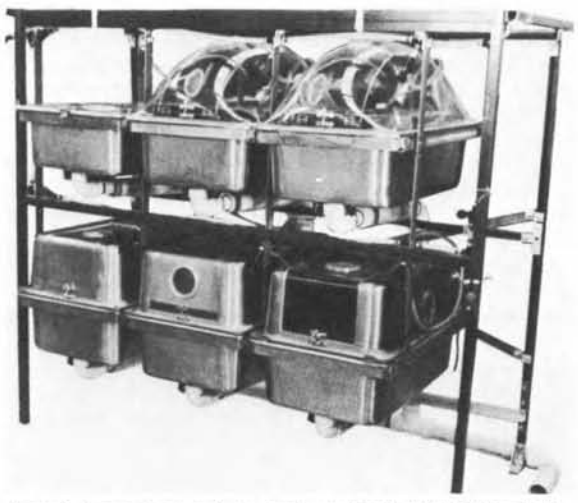


Figure 2. A six-enclosure, stackable, stainless-steel model of MEESA showing several alternative configurations. Stainless steel is used to avoid plasticizers.

The Amphibian Facility can provide *Xenopus laevis*, *Bombina orientalis*, and *Hyperolius* sp., but its major focus continues to be Northern *Rana pipiens*. It is to be noted that a major realization

in the past several years has been that although the life cycles of ranids from more temperate areas seem quite amenable to control as revealed by their culture at the Laboratory for Amphibian Biology, Hiroshima, by Bagnara (personal communication) at Tempe, Arizona, and at the Amphibian Facility, the Northern *R. pipiens* and *R. catesbeiana* are particularly refractory. Progress is being made on both species, however, and we have succeeded in bringing Northern *R. pipiens* to maturity in 8 months, compared with 24 to 36 months in nature, and progress has been reported on work with *R. catesbeiana* (Culley, 1977).

Two commercial concerns, one over three years old (Xenopus Ltd., #60) and one currently becoming established (Ozark Amphibian Center, #39), have adopted Amphibian Facility techniques in their attempts to provide service to the scientific and teaching communities. Thus, although the recommendations of the Sub-Committee on Amphibian Standards, Committee on Standards of the National Research Council (Nace et al., 1974) and the Committee on Herpetological Resources (Wake, et al., 1975) regarding frog culture will not be fully satisfied immediately, there is reason to believe that within the next few years amphibian culture will contribute to the alleviation of the demand for amphibians in a much more significant way than seemed possible six years ago.

Regarding the list of suppliers, it will be noted that no prices or statements concerning the availability or conditions under which these animals can be supplied are included in this list. Also, the species are listed as given by the supplier. We have not attempted to review the taxonomic validity of the terms. The supply and developmental stage of animals from all sources are subject to seasonal and other factors which are generally beyond the control of the supplier. Particularly difficult in recent years has been the problem of transportation. Deterioration in the services of the U.S. Postal Service and vagaries in the use of commercial transport concerns have added to the cost and difficulty of transporting animals. Users are urged to communicate directly with the listed sources to obtain the necessary purchasing or exchange information as well as the details concerning the availability of materials.

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Nace, G. W., C. M. Richards, and G. M. Hazen. 1973. Information control in the Amphibian Facility: The use of *R. pipiens* disruptive patterning for individual identification and genetic studies. *Amer. Zool.* 13:115-137.

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Wake, D. B., R. C. Zweifel, H. C. Dessauer, G. W. Nace, E. R. Pianka, G. B. Rabb, R. Ruibal, J. W. Wright, and G. R. Zug. 1975. Report of the Committee on Resources in Herpetology. *Copeia* 1975:391-404.

LIST OF SUPPLIERS

Prepared at the Amphibian Facility, October 1977

Address: Division of Biological Sciences, The University of Michigan, Ann Arbor, Michigan 48109

Telephone: Office 313-764-1471; Facility 313-764-7104

† Some animals from the wild near their place of business

* Some animals obtained from stocks reared or bred on their premises

§ Define their animals by the standard terminology found in Nace et al., 1974.

* § 1. Amphibian Facility
University of Michigan
405 S. Fourth Street
Ann Arbor, Michigan 48109
Att: Dr. George W. Nace, Director
Tel: 313-764-7104 or 764-1471

* 2. Ann Arbor Biological Center, Inc.
6780 Jackson Road
Ann Arbor, Michigan 48103
Tel: 313-761-8600

* 3. Axolotl Colony
Department of Biology
Indiana University
Bloomington, Indiana 47401
Att: Dr. George Malacinski
Tel: 812-337-1131 or 337-2630

–. Bankston, J. (see #25)

* 4. Dr. J. C. Beetschen
Laboratoire de Biologie General
118 Route de Narbonne
Université Paul Sabatier
Toulouse, Cedex 31077
France
Tel. /61/81-04-85

–. Benton, J. (see #31)

5. Bio-Aquatics International, Inc.
P.O. Box 442
Rochester, Michigan 48063
Att: Mr. Patrick McKown or Mr. Samuel DeFazio
Tel: 313-652-6622

6. Boreal Laboratories, Ltd.
1820 Mattawa Avenue
Mississauga, Ontario L4X 1K6
Canada
Att: Mr. Paul T. Heron, President
Tel: 416-279-7300
Cable: "BOREALAB"

–. Boyce, B. (see #26)

7. Braveo
P.O. Box 696
Temple, Texas 76501
Att: Mr. John Bravenec, Jr., Proprietor

Tel: 817-773-5757

—. Bunts, L. (see #16)

† 8. Carolina Biological Supply Co.
2700 York Road
Burlington, North Carolina 27215
Tel: 919-584-0381
Cable: "SQUID BURLINGTON NCAR"
(see also Powell Laboratories)

— Cauble, R. (see #19)

9. Charles P. Chase Co., Inc.
7200 N.W. 46th Street
Miami, Florida 33166
Tel: 305-592-5700
Cable: "BILCHASE"

† 10. F. Cimon Enterprises
P.O. Box 368
Loretteville, Quebec G2B 1G4
Canada
Tel: 418-842-6933

* 11. Mr. Gary L. Cole
Route 2
P.O. Box 2159
Oroville, California 95965
Tel: 916-343-0916

12. College Biological Supply
8857 Mt. Israel Road
Escondido, California 92025
Tel: 714-745-1445
and also

12a. College Biological Supply
21707 Bothell Way
Bothell, Washington 98011
Tel: 206-486-0731

† 13. Connecticut Valley Biological Supply Co., Inc.
Valley Road
Southhampton, Massachusetts 01073
Tel: 413-527-4030

† 14. Thomas Cook Ltd.
2 St. George's Street
P.O. Box 12
Cape Town 8000
Republic of South Africa
Att: Mr. S. K. Down or Mr. B. Rowlands
Tel: 22-1311
Telex: 57-7013SA
Cable: "THOMACOOK" Cape Town

* § 15. Dr. Dudley D. Culley
Louisiana State University
School of Forestry and Wildlife Management
Baton Rouge, Louisiana 70803
Tel: 504-388-6051

† 16. Dahl Biological Supply Co.
25 Hegenberger Place
Oakland, California 94621
Att: Mr. Larry Bunts, Proprietor
Tel: 415-562-1586

* 17. Dr. Louis Delanney
4712 N.E. 69th Street
Seattle, Washington 98115
Tel: 206-525-2893

† 18. Mr. Angelo DeRosa
Via Mazzini 37
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Tel: 081-731-3253

19. East Bay Vivarium
1511 MacArthur Boulevard
Oakland, California 94602
Att: Dr. Ronald L. Cauble, Proprietor
Tel: 415-530-7477

—. Emmons, M. (see #37)

† 20. Fisher Scientific Co.
Educational Materials Division
4901 West LeMoyne Avenue
Chicago, Illinois 60651
Tel: 312-378-7770

* 21. Mr. Peter Fraser
22534 Katzman Avenue
Mt. Clemens, Michigan 48043
Tel: 313-956-6050 (day)
313-779-5926 (night)

† 22. Frogs, Inc.
1070 Vickers — KSB&T Bldg.
Wichita, Kansas 67202
Att: Mr. C. L. Leaderbrand, President
Tel: 316-267-1566

—. Ganes, D. (see #41)

23. T. Gerrard and Co.
Gerrard House
Worthing Road, East Preston
Littlehampton, West Sussex BN16 1AS
England
Tel: Rustington 72071
Telex: 87323-FSI /prefix code: Biology

† 24. Graska Biological Supplies, Inc.
P.O. Box 2322
Oshkosh, Wisconsin 54901
Att: Mr. Gerald A. Graska, President
Tel: 414-233-4568

—. Griffin, J. (see #60)

† 25. Gulf-South Biologicals, Inc.
P.O. Box 417
Ponchatoula, Louisiana 70454
Att: Mr. Jim Bankston
Tel: 504-386-8250

† 26. J. M. Hazen and Co.
Alburg, Vermont 05440
Att: Mr. Brian Boyce
Tel: 802-796-3323

* 27. University of Hiroshima
Laboratory of Amphibian Biology
Faculty of Science
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Japan
Att: Dr. M. Nishioka, Director

* 28. Hubrecht Laboratories
International Embryological Institute
Uppsalalaan 8
Universiteitscentrum "De Uithof"
Utrecht
The Netherlands
Att: Dr. P. D. Nieuwkoop, Director
Tel: 030-510211

—. Indiana Univ. (see #3)

29. Interfish, Inc.
3000 Middlebelt
Inkster, Michigan 48141
Att: Mr. Tom Benson
Tel: 313-326-5555 or
313-447-9413 (home)
Cable: "INTERFISH" Detroit

† 30. Jacques Weil Biological Supply Co.
P.O. Box 125
Rayne, Louisiana 70578
Att: Mr. Mark Sayles
Tel: 318-334-3689

* 31. J-D Frog Ranch
RFD #2
Canton, Missouri 63435
Att: Mr. J. L. Benton, Proprietor
Tel: 314-288-3824

—. Kawamura, T. (see #27)

* 31a. Korea Frog Farms
Bupyong, P.O. Box 9
Inchon 160-70
Korea
Att: Mr. Lee Jong Jin, Proprietor

32. Kornatexport-Import
Zagreb
Yugoslavia
Att: Mr. Alexander Gulic
Tel: 041/424-203 or 423-249
Cable: "KORNATEXPORT ZAGREB"
Telex: 21340 yu kornat

—. Lantz, L. (see #35)

—. Leaderbrand, C. (see #22)

† 33. Jonathan Leakey, Ltd.
P.O. Box 1141
Nakuru
Kenya
Att: Mr. J. H. E. Leakey
Tel: Nairobi Radiocall 2003
Cable: "LEAKEY" Box 1141 Nakuru

† 34. The Wm. A. Lemberger Associates, Ltd.
P.O. Box 222
Germantown, Wisconsin 53022
Att: Ms. C. F. Lemberger
Tel: 414-677-4000

—. Malacinski, G. (see #3)

† 35. Midwest Reptile and Animal Sales, Inc.
P.O. Box 239
Ft. Wayne, Indiana 46801
Att: Mr. Larry A. Lantz, President
Tel: 219-743-1525
Cable: "MIDREP"

† 36. Mogul-ED
P.O. Box 2482
Oshkosh, Wisconsin 54901
Att: Mr. Tom Daggett
Tel: 414-231-8410

—. Mortimore, J. (see #59)

—. Nace, G. (see #1)

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Science Education Division
901 Janesville Avenue
Ft. Atkinson, Wisconsin 53538
Att: Mr. Marvin B. Emmons, Director
Tel: 800-558-9595
Telex: 26-5476 NASCO INT FTAN

† * § 38. Nasco Educational Materials Ltd.
58 Dawson Road
Guelph, Ontario N1H 6P9
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Att: Mr. Alan Baker, Science Manager
Tel: 519-836-3330
Telex: 069-56588

—. Nieuwkoop, P. (see #28)

—. Nishioka, M. (see #27)

* § 39. Ozark Amphibian Center
P.O. Box 1084
Ozark, Alabama 36360
Att: Mr. Dan Golda

40. Parco Scientific Co.
316 Youngstown-Kingsville Road, S.E.
Vienna, Ohio 44473
Tel: 216-856-2368

—. Pawley, R. (see #62)

* 41. The Pond Life Research Co.
P.O. Box 961
Grass Valley, California 95945
Att: Mr. Dean Ganes, Proprietor
Tel: 916-272-2224

† 42. The Powell Laboratories
P.O. Box 7
Gladstone, Oregon 97027
Tel: 503-656-1641
(see also Carolina Biological Supply)

—. Richards, C. (see #1)

† 43. Sargent-Welch Scientific Co.
7300 North Linder Avenue
Skokie, Illinois 60076
Tel: 312-677-0600
Cable: "WELMANCO"

* 44. Mr. Leonard Scales
820 Fountain Avenue
Ann Arbor, Michigan 48103 (business discontinued)
Tel: 313-665-2968

* 45. Slabaugh Bullfrog Farm
Rt. 3
P.O. Box 59
Popular Bluff, Missouri 63901
Att: Mr. Leonard Slabaugh
Tel: 314-785-7517

† 46. Snake Farm
P.O. Box 96
LaPlace, Louisiana 70068
Att: Mr. Dan Vicknair, Proprietor
Tel: 504-652-9229

† 47. South African Snake Farm
P.O. Box 6
Fish Hoek 7975
Republic of South Africa
Att: Mr. John Wood, Proprietor
Tel: 82-2912
Cable: "VENOMOUS" Fish Hoek, S.A.

48. Southern Biological Supply Co.
McKenzie, Tennessee 38201
Att: Mr. A. C. King
Tel: 901-352-3000

† 49. Southwestern Scientific Supply Co.
4345 East Irvington Road
Tucson, Arizona 85714
Att: Dr. Lee Stackhouse, Proprietor
Tel: 602-790-7737

† * 50. Stacel
79290 Argenton-L'Eglise
Station D'Acclimation et D'Elevage
Bouille-Saint-Paul Deux-Sevres
France
Att: Mr. R. Guibert
Cable: "STACEL ARGENTON EGLISE FRANCE 79"

Stackhouse, L. (see #49)

† 51. Mr. Charles D. Sullivan

4700 Humber Drive, A-10
Nashville, Tennessee 37211
Tel: 615-832-0958

52. Tropical Animal Distributors, Inc.
156 N.W. 37th Street
Miami, Florida 33127
Att: Mr. Robinson Rogers, Jr., Proprietor
Tel: 305-576-0335

53. Turtox Products
Macmillan Science Co.
8200 South Hoyne Avenue
Chicago, Illinois 60620
Tel: 312-488-4100

† 54. Mr. Paul van den Elzen
P.O. Box 499
Stellenbosch
Republic of South Africa
Tel: Stellenbosch 2986

—. Vicknair, D. (see #46)

55. Wards Natural Science Establishment, Inc.
P.O. Box 1712
Rochester, New York 14603
Tel: 716-467-8400
Cable: "COSMOS" Rochester
(see also Wards of California)

56. Wards of California
P.O. Box 1749
Monterey, California 93940
Tel: 408-375-7294
Cable: "COSMOS" Monterey
(see also Wards Nat. Sci. Estab.)

* 57. Mr. Travis L. Watson
Rt. 5
P.O. Box 248W
Ft. Worth, Texas 76126
Tel: 817-443-0239 or 921-2333

58. West Jersey Biological Farm
South Marion Avenue
Wenonah, New Jersey 08090
Att: Mr. E. D. Parker, Proprietor
Tel: 609-468-1776

* 59. Western Scientific Supply Co.
1705 South River Road
P.O. Box 681
West Sacramento, California 95691
Att: Mr. Joel Mortimore, President
Tel: 916-371-2705

—. Wood, J. (see #47)

* § 60. Xenopus Ltd.
151 Frenches Road
Red Hill, Surrey RH1 2HZ
England
Att: Mr. John Griffin, Proprietor
Tel: Nutfield Ridge /073 782/2687 or
Redhill /0737/67224
Telex: 945935/Exporc/

* 61. Zetts Fish Farm and Hatcheries
Drifting, Pennsylvania 16834
Att: Mr. Andrew J. Zetts
Tel: 814-345-5357 or
814-345-6502 (home)

62. Zoological Center International
Hinsdale, Illinois 61257
Att: Mr. Ray Pawley
Tel: 312-325-3256

† 63. Zoologische Grosshandlung
Gutenbergstrasse 30
P.O. Bose 98
Holzminden 345
West Germany
Att: Mr. Alfred Koch
Tel: 05531/7150

Animals Available from Specified Suppliers

Anurans (frogs and toads)

BUFONIDAE

Bufo sp. 35, 43, 63
B. alvarius (Colorado river toad) 35, 51
B. americanus (American toad) 5, 13, 20, 30, 37, 51, 55, 56, 59, 60, 62
B. angusticeps 54
B. asper (hill toad) 35
B. blombergi (Blomberg's toad) 5, 35
B. boreas (Western toad) 5, 19, 51, 59, 60
Bufo bufo (common toad) 5, 23, 35, 50, 59, 60
B. calamita (Natterjack) 51
B. cognatus (Great Plains toad) 5, 51
B. compactilis (Texas toad) 51
B. debilis (green toad) 5, 51
B. gariepensis 54
B. guercicus 5
B. marinus (marine or giant toad) 5, 9, 34, 35, 36, 37, 40, 41, 49, 50, 51, 52, 55, 56, 58, 60, 62
B. mauretanicus (Berber toad) 35
B. melanostictus 35
B. pardalis 47, 54
B. poweri (garden toad) 5
B. punctatus (red-spotted toad) 5, 51
B. quercicus (oak toad) 51
B. rangeri 54
B. regularis (African squareback toad) 33, 35, 47
B. rosei 54
B. terrestris (Southern toad) 5, 35, 51, 60
B. valliceps (Gulf Coast toad) 5, 51
B. viridis (green toad) 5, 35, 60
B. woodhousei (Woodhouse or Fowler's toad) 5, 13, 30, 35, 51, 60

DENDROBATIDAE

Dendrobates auratus (arrowhe d poison frog) 19

DISCOGLOSSIDAE

Alytes obstetricans (midwife toad) 51, 60
Bombina sp. 63
B. bombina (fire-bellied toad) 18, 19, 35
B. orientalis (bell frog) 1, 27, 60
B. variegata (yellow-bellied toad) 35, 60
Discoglossus pictus (Spanish painted frog) 35

HYLIDAE

Acris blanchardi (Blanchard's cricket frog) 51
A. crepitans (Northern cricket frog) 5, 51
A. gryllus (Southern cricket frog) 5, 51
Agalychnis dachnicolor 19, 49
Hyla sp. 16, 36, 43, 49
H. arborea (European treefrog) 18, 35, 50, 51, 60
H. arenicolor (canyon treefrog) 35, 51
H. avivoca (bird-voiced treefrog) 51
H. cadaverina (California treefrog) 51
H. chrysoscelis (Southern grey treefrog) 51
H. cinerea (green treefrog) 5, 19, 23, 30, 35, 46, 49, 51, 60
H. crucifer (spring peeper) 5, 13, 51, 60
H. femoralis (pine wood treefrog) 51
H. gratiosa (barking treefrog) 5, 19, 35, 51
H. regilla (Pacific treefrog) 19, 35, 51, 59
H. septentrionalis (Cuban treefrog) 9 51
H. squirella (squirrel treefrog) 5, 51
H. vasta (giant treefrog) 9
H. versicolor (common or gray treefrog) 5, 13, 19, 35, 51, 60
Limnaoedus ocularis (little grass frog) 51
Phrynohyas venulosa 19
Pseudacris brachyphona (mountain chorus frog) 51, 60
P. clarki (spotted chorus frog) 5, 51
P. nigrita (chorus frog) 5, 51
P. ornata (ornate chorus frog) 5, 51
P. streckeri (Strecker's chorus frog) 51, 60
P. triseriata 5, 51

LEPTODACTYLIDAE

Ceratophrys calcarata (horned frog) 9, 35
Eleutherodactylus ricordi (green-house frog) 51
Heleophryne sp. 54

MICROHYLIDAE

Breviceps sp. 54
Gastrophrynae carolinensis (Eastern narrowmouth toad) 51
Gastrophrynae olivacea (Western narrowmouth toad) 51
G. carolinensis 5
G. olivacea 5
G. variolosus 5
Kaloula pulchra 19, 35

PELOBATIDAE

Pelobates fuscus 63
Scaphiopus sp. 35
S. hombifrons (plains spadefoot toad) 51, 60
S. couchi (Couch's spadefoot toad) 35 51
S. hammondi (Western spadefoot toad) 51
S. holbrooki (Eastern spadefoot toad) 51, 60
S. hurteri (Hurter's spadefoot toad) 51

PHRYNOMERIDAE

Phrynomerus sp. 35
P. bifasciatus (red-backed frog) 54

PIPIDAE

Pipa pipa (Surinam toad) 35
Xenopus borealis (Kenyan clawed toad) 60
X. gilli 5, 54
X. laevis (South African clawed toad) 1, 2, 5, 14, 16, 21, 23, 28, 29, 33, 36, 37, 38, 39, 40, 44, 47, 49, 50, 51, 54, 60
X. laevis (periodic albinism) (South African clawed toad) 1, 28, 44
X. mulleri 44
X. tropicalis (Nigerian clawed toad) 60

RANIDAE

Arthroleptella sp. 54
Cacosternum capense 54
Ptychadena anchietae (Savanna sharp-nosed frog) 33
P. mascareniensis (green-striped frog) 33
Pyxicephalus adspersus 19, 54
P. delalandii 54
Rana sp. 16, 54, 62
R. adspersa (African bullfrog) 5, 33
R. areolata (crawfish frog) 5, 51
R. berlandieri (Rio Grande leopard frog) 1, 51
R. blairi (plains leopard frog) 1, 5, 51
R. capito (gopher frog) 51
R. catesbeiana (bullfrog) 5, 7, 10, 11, 12, 12a, 13, 15, 16, 20, 22, 25, 30, 31, 31a, 34, 35, 36, 37, 38, 40, 41, 43, 45 46, 48 49, 51, 53, 57, 58, 59, 60, 61, 62
R. catesbeiana x *R. grylio* 7
R. clamitans (green or bronze frog) 5, 24, 34, 35, 36, 37, 38, 46, 51
R. esculenta (edible frog) 18, 23, 32, 50, 60, 63
R. graeca 18
R. grylio (pig frog) 5, 7, 25, 49, 51
R. heckscheri (river frog) 5, 51
R. japonica 27
R. nigromaculata 27
R. occipitalis (groove-crowned bullfrog) 33
R. palustris (pickerel frog) 5, 35, 51, 60
R. pipiens (leopard or grass frog) 1, 5, 6, 8, 10, 12, 12a, 13, 16, 20, 22, 23, 24, 25, 26, 29, 30, 34, 35, 36, 37, 38, 39, 40, 42, 43, 48, 49, 53, 55, 56, 58, 59, 60, 62
R. ridibunda (marsh frog) 60
R. septentrionalis 5
R. sylvatica (wood frog) 5, 13, 35, 51
R. temporaria 23, 24, 59, 60, 63
R. tigrina 16
R. utricularia (sphenocephala) (Southern leopard frog) 1, 5, 51

RHACOPHORIDAE

Chiromantis petersi 35
Hyperolius sp. 1, 33, 35, 54
Kassina senegalensis (African walking frog) 35

Urodeles (salamanders and newts)

AMBYSTOMATIDAE

Ambystoma sp. 5, 19, 34, 43, 48
A. annulatum (ringed salamander) 51
A. cingulatum (frosted flatwoods salamander) 51
A. jeffersonianum 5, 35, 51, 60
A. maculatum (spotted salamander) 5, 13, 35, 36, 51, 60
A. mexicanum (Mexican axolotl) 1, 3, 4, 17, 23, 28, 60
A. opacum (marbled salamander) 5, 35, 51, 60
A. talpoideum (mole salamander) 51, 60
A. texanum (small-mouthed salamander) 5, 35, 51
A. tigrinum (tiger salamander) 5, 20, 24, 30, 35, 36, 38, 50, 51, 59, 60, 62

AMPHIUMIDAE

Amphiuma sp. (Congo eel) 5, 8, 25, 30, 36, 46, 48, 49, 59
A. means (two-toed amphiuma) 51, 60
A. tridactylum (three-toed amphiuma) 51

CRYPTOBRANCHIDAE

Cryptobranchus alleganiensis (hellbender) 51
Megalobatrachus japonicus (giant salamander) 35

PLETHODONTIDAE

Aneides aeneus (green salamander) 51
A. ferreus (clouded salamander) 51
A. flavipunctatus (speckled black salamander) 51
A. lugubris (arboreal salamander) 51
Batrachoseps attenuatus (California slender) 51
B. major (garden slender salamander) 51
Desmognathus auriculatus (Southern dusky) 51
D. fuscus (dusky salamander) 35, 51
D. monticola (seal salamander) 35, 51
D. ochrophaeus (Blue-Ridge Mt. salamander) 35, 51
D. quadramaculatus (black-bellied salamander) 35, 51, 60
D. wrighti (pigmy salamander) 51
Ensatina eschscholtzi (Monterey salamander) 51
E. xanthoptica (yellow-eyed salamander) 51
Eurycea bislineata (two-lined salamander) 13, 35, 51
E. longicauda (longtailed salamander) 35, 51
E. lucifuga (cave salamander) 35, 51, 60
Gyrinophilus danielsi (Blue Ridge Mt. spring salamander) 35, 51
G. dunni (Carolina spring salamander) 51
G. porphyriticus (Northern spring salamander) 5, 35, 51
Hemidactylium scutatum (four-toed salamander) 51
Leurognathus marmoratus (shovelnose salamander) 51
Manculus quadridigitatus (dwarf salamander) 51
Plethodon cinereus (red-backed salamander) 5, 13, 35, 51
P. dorsalis (zig-zag salamander) 5, 35, 51
P. glutinosus (slimy salamander) 5, 35, 51
P. jordani (red-legged salamander) 51
P. richmondi (ravine salamander) 51
P. welleri (Weller's salamander) 51
P. yonahlossee (Yonahlossee salamander) 51
Pseudotriton diastictus (midland mud salamander) 51
P. floridanus (rusty mud salamander) 51
P. ruber (red salamander) 5, 35, 51, 60
P. schenki (black-chinned red salamander) 51
P. vioscai (Southern red salamander) 51

PROTEIDAE

Necturus sp. 16, 34, 37, 38, 46, 48, 53, 55, 56, 59
N. maculosus (mud puppy) 5, 8, 12, 12a, 13, 20, 24, 35, 36, 50, 51, 60

SALAMANDRIDAE

Cynops pyrrhogaster (= Triturus pyrrhogaster) (Japanese fire-bellied newt) 27
Diemictylus perstriatus (striped newt) 51
Notophthalmus viridescens (= Triturus or Diemictylus viridescens) (red-spotted newt) 5, 8, 13, 20, 36, 51, 55, 56, 59, 60, 61
Pleurodeles waltlii (Spanish ribbed newt) 4, 28, 50, 51, 60
Salamandra maculosa 63
S. salamandra (fire salamander) 19, 23, 35, 51, 60, 62
Taricha sp. (California or Western newt) 8, 16, 42, 59
T. granulosa (rough-skinned newt) 51
T. rivularis (red-bellied newt) 51
T. torosa (Western newt) 51
Triturus sp. 48
T. alpestris (alpine newt) 23, 35, 51, 60, 63
T. cristatus (crested newt) 18, 23, 50, 51, 60, 62, 63
T. helveticus (palmate newt) 23, 35, 50, 51
T. italicus 18
T. marmoratus (marbled newt) 35, 50, 51, 60
T. palmatus 63
T. vulgaris (common or smooth newt) 18, 23, 51, 60, 63

SIRENIDAE

Pseudobranchus striatuss (mud or dwarf siren) 5, 51
Siren sp. 48, 59
S. intermedia (lesser siren) 51
S. lacertina (greater siren) 5, 51, 60

Location of Suppliers

A. Northeastern U.S.A. (Conn., Mass., Me., N.H., N.J. N.Y., Pa., R.I., Vt.; Quebec & eastern Canada) 10, 13, 26, 55, 58, 61
B. Southeastern Coastal States (Del., Fla., Ga., Md., Eastern N.C., S.C., Va.) 8, 9, 52
C. Great Lakes States (Ill., Ind., Iowa, Mich., Minn., Ohio, Wis.; Ontario) 1, 2, 3, 5, 6, 20, 21, 24, 29, 34, 35, 36, 37, 38, 40, 43, 53, 62
D. Appalachians (Ky., Western N.C., Tenn., W. Va.) 48, 51
E. Lower Mississippi Valley and Gulf States (Ala., Ark., La., Miss., Mo.) 15, 25, 30, 31, 39, 45, 46
F. Northern Plains and Northern Rockies (Mont., Neb., N.D., S.D., Wyo.; Alberta, Manitoba, Sask.) no listings
G. Southwest and Southern Rockies (Ariz., Colo., Kan., N.M., Okla., Tex., Utah) 7, 22, 49, 57
H. Northwestern U.S.A. (Id., Ore., Wash.; British Columbia) 12a, 17, 42

I. Southern West Coast (Calif., Nev.)
11, 12, 16, 19, 41, 56, 59

J. Central and South America
no listings

K. Europe and Western Russia 4, 18, 23, 28, 32, 50, 60, 63

L. Africa 14, 33, 47, 54

M. Far East 27, 31a

ADDENDUM to "Sources of Amphibians for Research. II".

Already there are additions to "Sources II".

a. Animals of Distinction
Rt. 4, Box 241
Fort Pierce, Florida 33450
Attn: Bob Roth
Tel: 305-465-2092

b. The Shed
6932 N.W. 46th St.
Miami, Florida 33166
Attn: Joe Beraducci
Tel: 305-542-3484

Bombina orientalis - fire bellied toad
Triprion petasatus - casque headed treefrogs
Agalychnis callidryas - red eyed tree frog
Rana pipiens (albino) - leopard frog
Megophrys nasuta - Asian horned frog
Atelopus varius - poison arrow frog
Eleutherodactylus inopatus - Haitian forest frog
Phrynohyas venulosa - marbled tree frog
Smilisca baudini - Central American tree frog
Pyxicephalus delalandei - puddle frog
Pyxicephalus adspersus - African bullfrog
Bufo alvarius - Colorado River toad
Xenopus laevis (albino) - African clawed frog
Hyla gratiosa - barking tree frog
Hyla versicolor - gray tree frog
Hyla septentrionalis - Cuban tree frog
Bufo cognatus - Great Plains Toad
Bufo speciosus - Texas toad
Scaphiopus hammondi - western spadefoot
Pleurodeles waltl - ribbed newt
Salamandra s. terrestris - European salamander
Typhlonectes natans - aquatic caecilian
Dermophis mexicanus - Central American caecilian

c. Zoological Imports and Products, Inc.
400 E. Warren Lane
Inglewood, California 90302
Attn: Paul A. Benson
Tel: 213-677-1202
Cable: "TELIMPO"
Telex: 686112

Ambystoma maculatum - spotted salamander
Ambystoma t. mavortium - barred tiger salamander
Ambystoma trigrinum - tiger salamander
Notophthalmus v. viridescens - red-spotted newt
Siren i. intermedia - eastern lesser siren
Taricha granulosa - rough skin newt
Dendrobates sp. - red and brown arrow frog
Hyla cinerea - green tree frog
Hypopachus mulleri - Muller's sheeps frog
Kaloula pulchra - Asiatic painted frog
Megophrys nasutus - Asiatic horned frog
Rana adspersa - burrowing bullfrog
Rana pipiens - leopard frog
Racophorus l. leucomystax - Thailand gliding frog
Smilisca phaeota - C. A. green tree frog
Bufo alvarius - Colorado River toad
Bufo garmani - spotted toad
Bufo poweri - garden toad
Bufo quercicus - oak toad
Bufo melanostictis - black spiny toad
Bufo paruus - banded legged toad

GEORGE W. NACE and JEFFREY K. ROSEN, Division of Biological Sciences and Center for Human Growth and Development, the University of Michigan, Ann Arbor, Michigan 48109.

Herpetological Husbandry

Record Crocodile Growth Rate?

A marsh crocodile or mugger (Crocodylus palustris) reared from the egg stage at the Madras Crocodile Bank has grown at an unprecedented rate. This crocodile and 12 siblings hatched in May 1975 from eggs collected at Hogenakal, Salem District by Madras Crocodile Bank staff with Forest Department permission. All of the "Hogenakal hatchlings" have grown at a more rapid rate than the other 200 crocodiles at the Bank, but one particular animal (called M-2) outdoes them all (photograph). At hatching, M-2 was 28 cm in length and weighed 50 gms. In the first year he grew to 1.04 m and weighed 5 kg. By his second year he was 1.60 m and 12 kg. This year in June, M-2 was 3 years old and measures 2.10 m and 35 kg. He eats an average of 3 kgs of mixed fish per week. The average crocodile growth rate is said to be 30 cm per year. M-2 has averaged 60 cm per year but shows signs of slowing down.



Allen Vaughan, Crocodile Bank Manager, holding M-2, the 3 year old "Hogenakal Hatchling".

MADRAS CROCODILE BANK, Vadanemmeli Village, Mahabalipuram Road, Chingleput District, India. ●

Black Pine Snakes Hatch at Philadelphia Zoo

Two adult pair of black pine snakes (Pituophis melanoleucus lodingi) are maintained at the Philadelphia Zoo. The breeding male arrived on 26 April 1973; the females on 14 May 1974 and 19 April 1977.

All four specimens were kept at 14.4° C throughout the winter; the temperature was elevated to 26.7° C in early April. Mating occurred shortly thereafter, with one male being responsible for both breedings. The second female laid a clutch of six eggs on 8 June, and the original female 5 eggs on 24 June. The eggs were incubated in moist beach sand at 26.7° C. One specimen hatched from the first clutch, and four from the second. The incubation period for both clutches was 65 days. The hatchlings are feeding on two-week old mice. We would appreciate hearing from anyone else who has successfully reproduced this subspecies.

...from AAZPA Newsletter, 19(10): 8 (1978).

New Reptile Display at Cohanzick Zoo

The Cohanzick Zoological Society has begun construction of the new reptile display. This exhibit will be approximately 10' long, 5' wide and 4' high. It will include Jersey stone, pools and natural paintings relevant to South Jersey. The zoo is working closely with the state of New Jersey Fish and Game Department to furnish reptiles native to this area. The display will be open for public viewing by January 1979.

...from AAZPA Newsletter, 19(11): 21 (1978).

Floating Containers for Rearing Tadpoles

Large tanks of various designs have been used successfully in rearing anuran tadpoles. Designs or descriptions of some rearing tanks are available in the literature (see Stenroos, 1978), and other rearing tanks are available commercially (e.g., "Min-O-Cool" and "Living Stream" by Frigid Units, Inc., Toledo, Ohio). When using such tanks, I have found it convenient to also use several porous, floating containers to separate groups of tadpoles. In this way, the tadpoles can be reared in essentially the same chemical and thermal environment, but groups (such as the offspring of different matings) can be separated. The tadpoles are also easier to feed and capture when held in the smaller, floating containers.

Containers can be made from plastic boxes which are sold in department stores for storage of shoes or clothing. The two most commonly available sizes are 17 x 31 x 9 cm and 26 x 35 x 11 cm. I make the containers porous by punching holes, 1-2 cm apart, in all sides and bottoms of the boxes. The diameters of the holes depend on the species to be reared. Holes need to be small enough that early swimming larvae cannot escape, but large enough that fecal wastes are flushed out by the water circulating through the tank. Holes made by heating a standard dissection probe (1.2 mm diam.) and pushing it through the thin plastic walls are satisfactory for rearing both Pseudacris triseriata and Xenopus laevis tadpoles.

The containers are modified to float at the surface by gluing 2 x 2 cm strips of styrofoam around their outer rims, in the fashion of some commercial minnow pails. Some types of glue will dissolve the styrofoam, but 5-minute epoxy has worked well for me. The strips are glued flush with the rims of the plastic boxes, so they float with 2 cm "walls" above the surface. A completed floating container is shown in Fig. 1. Problems with tadpoles jumping these walls have not been encountered while rearing Pseudacris or Xenopus. For larger tadpoles, it might be necessary to use deeper styrofoam strips or to glue the strips lower down the sides to heighten the barriers separating tadpole groups, or to use the plastic covers which are supplied with the boxes.

I have not tested for optimum tadpole densities or crowding effects in any systematic fashion, but have had good success rearing both Pseudacris and Xenopus tadpoles by arbitrarily maintaining 25 tadpoles per 17 x 31 x 9 cm container or 50 tadpoles per 26 x 35 x 11 cm container. Tadpole densities will have to be adjusted through experience, and will be influenced by such factors as the total volume of the tank, the filtering efficiency of the tank, the frequency of water changes, the water temperature, and the size of the tadpoles.

LITERATURE CITED

Stenroos, O. O. 1978. A compact tank for maintaining large numbers of tadpoles (Amphibia, Anura). J. Herpetol. 12: 97-98.

DAVID M. HOPPE, Division of Science and Mathematics, University of Minnesota, Morris, Minnesota 56267. ●



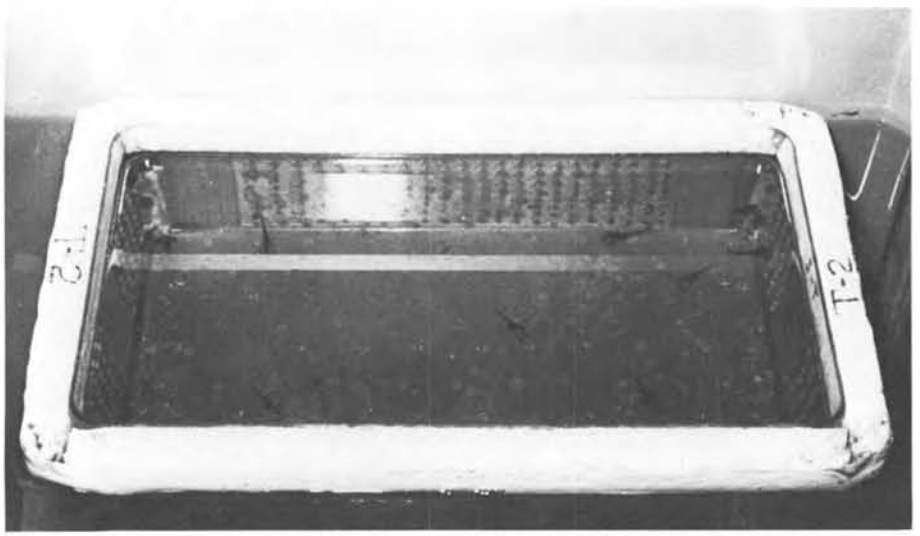


Fig. 1. A floating tadpole container with Xenopus laevis tadpoles.

Book Reviews

COMMON INDIAN SNAKES: A FIELD GUIDE by Romulus Whitaker. 1978. The Macmillan Company of India Limited, Delhi xiv + 154 p. 12.00 Rs (about $1.50 in India).

In the author's words "this book does not attempt to describe all Indian snakes,"...but presents "30 representative forms, most of which might be encountered by the average citizen." The goal of this volume is to provide a simple means of identifying Indian snakes and to characterize their ecology and habits. The writer's style is semi-technical, pleasant, and sometimes "off the cuff." The first half of the book is devoted to capsulized accounts of the "30 representative forms." Each contains information on the features, distribution, habits, food, habitat, status and other pertinent natural history. All 30 forms are illustrated with black and white photographs, most of which are acceptable to good in quality. Some of the species seldom photographed include: Perrotet's shieldtail, Plectrurus perroteti; banded kukri, Oligodon arnenensis; striped keelback, Amphiesma stolata; green keelback, Macropisthodon plumbicolor; olive keelback watersnake, Atretium schistosum; trinket snake, Elaphe helena; banded racer, Argyrogena fasciolatus; bronzeback tree snake, Dendrelaphis tristis; and, the slender coral snake, Callophis melanurus.

The book is interlaced with interesting natural history and "current status" tidbits. Excerpts include: "...rampant deforestation may lead to the extinction of some of the worm snakes (Typhlopidae) and Shieldtails (Uropeltidae)" "...Typhlina bramina exists in all female populations..." "Red sand boas Eryx johnii are one of the few snakes which can penetrate the blocked burrows of the rice destroying mole rat..." "Olive keelbacks eat mosquito larvae..." "Bronzebacks have no fear of falling and regularly jump among branches and to the ground from heights of 10-20 m..." "Vine nakes, Ahaetulla nasutus during the breeding season often bunch together in a cluster..." "Russell's vipers form a major resource of the skin industry in South India, and in some areas have been completely exterminated."

The remainder of the book is devoted to "General facts about snakes" including conservation and snakebite, a checklist of the snakes of India, and a key to Indian snakes which is adapted from Minton's (1962 AMNH Novitate No. 2081, p. 1-60) publication of Sind and Las Bela, West Pakistan. This portion of the book varies greatly in style and

treatment. The reader may be amazed how closely some of the "wives tales" of the region parallel ours, yet how bizarre are others. I was impressed by the real importance of snakes within many of India's subcultures and the size of the snakeskin industry. Between April 1967 and March 1968, India exported 358,413 kg of snake skins valued at 107,651,889.00 Rs. This in spite of the estimate by Dr. Salim Ali that "20-50 percent of India's grain crop is destroyed by rodents."

One of the most pleasant features of the book is the checklist of 233 species of Indian snakes, complete with English names and ranges. There are some questionable statements and a few typographical errors; however, the book is a must for anyone even vaguely interested in Asiatic ophidians. Mr. Whitaker is to be commended for providing impetus to our understanding of Indian herpetology and wildlife.

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A FIELD GUIDE TO AUSTRALIAN FROGS by John Barker and Gordon Grigg. 1977. Rigby Limited, Sydney, 229 pp., cloth bound. (Obtainable from Dr. Gordon Grigg, Department of Biological Sciences, University of Sydney, Sydney, N.S.W., 2006, Australia, for $26.00 U.S. including airmail postage; make checks payable to Gordon Grigg).

The diverse and distinctive frog fauna of the Australo-Papuan Region has been the subject of more popular accounts in the last three years than ever before. Menzies' (1975) account of New Guinean frogs, Cogger's (1975) guide to Australian amphibians and reptiles, and Tyler's (1976) discourse on the biology of frogs all contain valuable information for the amateur and professional alike, and each is enhanced with excellent colored photographs of frogs. To the assemblage of distinguished books, another has been added.

Barker and Grigg's "Field Guide to Australian Frogs" is an attractive book printed on high-quality glossy paper, 135 x 180 cm and sturdily bound in green cloth. The colored photographs, depicting all species recognized prior to 1976, are superb. Almost all of the photographs, taken of frogs in natural settings, are the excellent work of Gordon Grigg. The color reproduction is generally excellent.

Although the book is designed as a field guide, three chapters deal with general topics. Chapter 1 is devoted to the evolution, taxonomy, and zoogeography of frogs. Here there are some minor errors concerning distributions of caecilians and salamanders, use of Protobatrachus for Triadobatrachus, and the specific statement: "As yet, no fossil frogs have been discovered in Australia..." Tyler (1974) reported fossil frogs from the mid-Miocene of Central Australia. Chapter 2, "Biology of Frogs," briefly treats locomotion, skin, senses, feeding and digestion, respiration and circulation, predation and defense, temperature relations, reproduction, and water relations. Despite the brief general treatment of these subjects, errors are few. On page 24, it is implied that all tadpoles are grazers, and the photograph on page 29 clearly shows ovulated eggs, not eggs contained in distended oviducts as stated in the legend. Chapter 4 deals with collecting, keeping and photographing frogs. The authors state that frogs are not protected by law except in national parks; presently frogs are protected in the Northern Territory, Victoria, and Western Australia. In the discussion of preserving frogs, no mention is made of the desirability of positioning the specimens in fixative. The method of obtaining excellent photographs of frogs is described.

The major part of the book is Chapter 3 on the systematics of the Australian frogs (170 pages). In this chapter, each family and genus is introduced, and each species is discussed with respect to identification, habitat, mating call, breeding and larvae, and similar species. Accompanying each species account is a colored photograph and an outline map of Australia showing the range in black.

I had an opportunity to use the book as a field guide in New South Wales and Queensland early in 1978. I found the descriptions to be reasonably accurate and the photographs to be tremendously helpful in identifying frogs. However, some errors were noted. On page 69, the top photo is Litoria inermis (not L. verreauxi) and the bottom photo is L. nigrofrenata (not L. jervisiensis). These photographs have been switched with those appearing on page 77, which in fact are L. verreauxi and L. jervisiensis (not L. inermis and L. nigrofrenata as labelled). The distribution maps are correctly identified. On page 83, the lower photograph is Litoria cyclorhynchus, not L. moorei, which is the top photograph on page 85.

Keys to the identification of frogs are notoriously difficult to construct and to use, especially those designed for nonprofessionals. Barker and Grigg have been fairly successful with their keys. Families are distinguished by brief diagnostic statements (pp. 40-41), but difficulty is evident in the Microhylidae, characterized by "... broad discs on the tips of the digits." This is not true for Spheno-phryne and several species of Cophixalus in Australia. In the key to Litoria (pp. 45-47), couplet 1b should go to 22, not 23; in couplet 11a, the posterior of thigh should be purple or orange; in couplet 22b, the dorsum should be green or brown. The inclusion of osteological characters in the keys of leptodactylid and microhylid frogs does not enhance the usefulness of the guide by amateurs. In place of a key to the complex of small frogs recognized in the genera Crinia, Geocrinia, and Ranidella, the authors present a lengthy table (pp. 180-183) summarizing morphological, reproductive, and distributional attributes of the 18 species.

Throughout the systematic accounts there are numerous errors. As examples: The account of the history of the name Nyctimystes on page 42 is completely incorrect (see Duellman and Trueb, 1976). In the discussion of the range of Limnodynastes (p. 104), Tasmania is omitted (inhabited by L. tasmaniensis), and New Guinea is not included in the range of L. ornatus. The meaning of the specific name of Limnodynastes terraereginae (p. 106) is Queensland, not "King of the Earth." The range of Rheobatrachus silus is not restricted to a single stream (p. 194); the species is known from three streams in the Conondale and Blackall ranges in southeastern Queensland; furthermore, the authors misquoted Corben, Ingram, and Tyler (1974) regarding the life history of Rheobatrachus. In their discussion of the Ranidae (p. 204), the authors used the generic name Gigantorana for Conraua.

Some of the maps are erroneous or difficult to interpret. The maps for Limnodynastes dumerilii (p. 109) and Neobatrachus pictus (p. 136) do not include the type localities. The restricted ranges of Pseudophryne australis and corroboree (p. 170) should have been emphasized by arrows. Taudactylus diurnus is consistently misspelled as "diurnis."

Despite some minor errors, Barker and Grigg's field guide is a great asset to biologists and naturalists interested in Australian frogs. In consort with Tyler's "Frogs" (Duellman, 1977), Australian naturalists now have two useful and complementary works on the anuran fauna. That fauna is still incompletely known; it is anticipated that the present field guide will be a great stimulus for additional studies of Australian frogs.

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COMMENTARY ON TAXONOMIC PRACTICE IN REGIONAL HERPETOLOGICAL PUBLICATIONS: A REVIEW OF A PRELIMINARY ACCOUNT OF THE RATTLESNAKES WITH THE DESCRIPTION OF FOUR NEW SUBSPECIES by Herbert S. Harris, Jr. and Robert S. Simmons (1978. Bull. Maryland Herpetol. Soc., 14(3): 105-211), with comments on other Harris and Simmons rattlesnake papers.

It is unusual for articles appearing in serial publications to be reviewed; however, the incorrect and improper taxonomic practices utilized, the dubious ethical standards observed, the presumptuous attitude indicated, and the apparent lack of proper review process evinced, as well as a plethora of more minor errors included in the papers under review, make the writing of this review mandatory.

Our principal concern herein is to review the paper recently published by Herbert Harris and Robert Simmons in the Bulletin of the Maryland Herpetological Society (Vol. 14, No. 3, pp. 105-211) entitled "A preliminary account of the rattlesnakes with the description of four new subspecies." It is necessary, however, in so doing to comment as well on several other papers on rattlesnakes published by Harris and Simmons in recent years. Unless otherwise specified, our use of the phrase "Harris and Simmons" refers to the above-cited paper.

Harris and Simmons purport to have presented a "preliminary account of the rattlesnakes." In reality, they have presented only an abbreviated checklist in which they list all species and subspecies they recognize as valid (with incomplete synonymies) and include the "descriptions" of four new subspecies. In addition, they include photographs or drawings of all species and subspecies (a few of which have not been illustrated previously) and distribution maps for each.

Harris and Simmons stated (p. 105) that "two recently described subspecies on which the descriptions are in press are included as they should appear prior to this paper." Unfortunately, one of the papers in which one of the descriptions is included did not appear prior to the publication of the Harris and Simmons paper and the other did not appear prior to the submission of the Harris and Simmons paper for publication. They have committed, therefore, an act of heteroplagiarism and indicated the intent to commit an act of homoplagiarism (in the sense used by Smith, et al., 1975).

First we wish to discuss the case of heteroplagiarism. On page 111 of the Harris and Simmons paper they use the name Crotalus durissus neoleonensis for a subspecies of the Neotropical Rattlesnake from the Mexican state of Nuevo Leon in advance of the publication of a paper by Jordi J. Zertuche describing this subspecies. In addition, they furnish a photograph and provide a specimen number and a type locality for the holotype. In so doing, they have created a nomen nudum. Such names, fortunately, have no nomenclatural standing and, thus, once the Zertuche description is published, the name will be occupied as of that paper. It should be pointed out, however, that there is no need to, nor, indeed, is there any excuse for using a scientific name in advance of its formal description. This practice is unethical and contrary to the accepted rules of taxonomic procedure. Zertuche may well have reason to ask what right Harris and Simmons had to use his name in advance of its publication by him. We wonder why they could not have simply placed this taxon, unnamed, in proper sequence as they did with other undescribed taxa (e.g., Crotalus triseriatus subsp., Sistrurus ravus subsp.).

On page 112 Harris and Simmons used the name Crotalus durissus trigonicus for a subspecies of the Neotropical Rattlesnake occurring in the Rupununi Savanna in Guyana in advance of the known publication of the paper by the same two authors describing this subspecies. The paper describing C. d. trigonicus (Harris and Simmons, 1978) was accepted for publication on 13 April 1977 and the paper under review was supposedly submitted for publication (by Harris, the author, to Harris, the editor) on 6 November 1977. It is an extremely unwise procedure to use a name prior to its publication. With respect to the case in point, the issue of the Memorias do Instituto Butantan in which the description of C. d. trigonicus appears and which is dated 1976/1977 has yet to be accessioned into the collections of at least two university subscribers as of this writing. In fact, the issues of the Memorias do Instituto Butantan have a history of appearing at least a year later than the publication date printed on the issue. Harris and Simmons have demonstrated, therefore, the intent to commit an act of homoplagiarism (in the sense of Smith, et al., 1975) and to create a nomen nudum.*

These authors committed a similar error when in 1974 they used the name Crotalus willardi obscurus in a popularized article published in National Parks and Conservation Magazine, which also contained a photograph of a paratype of the subspecies, as well as an oblique reference to the distinctive characteristics of the taxon. Apparently, the action of including these extremely brief remarks was sufficient to occupy the name C. w. obscurus, according to Smith, et al. (1975). In the 1974 paper Harris and Simmons committed an act of homoplagiarism but avoided creating a nomen nudum because of the inclusion of the above-mentioned descriptive statements. A complete description followed two years later (Harris and Simmons, 1976). As we have pointed out above, a scientific name should never be used in advance of its known formal description. The rules of zoological nomenclature have been established so as to allow for the stabilization of scientific names. Subversion or ignorance of these rules cannot be condoned.

On another matter, Harris and Simmons presented "abbreviated descriptions" of four new subspecies of rattlesnakes (Sistrurus ravus brunneus, S. r. lutescens, Crotalus ruber monserratensis, and C. triseriatus quadrangularis) in advance of the "formal descriptions" they are intended to follow. Harris and Simmons stated that "although this is not a standard practice, we hope it will be tolerated for the sake of

*Information recently received from the Chief Librarian at the Instituto Butantan concerning the dates of publication and distribution of the volume of the Memorias do Instituto Butantan in which the above-discussed paper was published, indicates that volume 40/41 (1976/1977) was published in September of 1978 and distributed on November 22, 1978. The issue of the Bulletin of the Maryland Herpetological Society in which the above reviewed Harris and Simmons paper was published and in which the name C. d. trigonicus is used is dated September, 1978 and was received by one of us (JRM) on 6 November 1978. Harris and Simmons, therefore, actually did commit homoplagiarism.

completeness." They are entirely correct in stating that this is not "standard practice." On the one hand, this practice is by no means taxonomically defensible and cannot be "tolerated" for the sake of completeness or any other reason. There is no reason whatsoever that these "abbreviated descriptions" should ever be published in advance of the complete description. We now wish to discuss the problems that can thereby arise.

Harris and Simmons described a new subspecies of Crotalus triseriatus from Hidalgo. In the vague diagnosis of this new subspecies, C. t. quadrangularis, they compare it almost exclusively to C. aquilus, which they raised to specific rank in this paper (it was formerly considered a subspecies of C. triseriatus). They only briefly compare C. t. quadrangularis to C. t. triseriatus and not at all to C. t. anahuacus, which latter subspecies Harris and Simmons resurrected in this paper. In addition, the statement that compares C. t. quadrangularis to C. t. triseriatus is inexplicable to us, inasmuch as they say that "C. t. quadrangularis can be separated from C. t. triseriatus in having a larger rattle size as was indicated by Klauber for C. aquilus." A diagnosis of a new subspecies should ideally compare the new taxon to all previously described subspecies within the species, but should certainly not compare the new subspecies almost exclusively to another species!

Another "abbreviated description" needs to be examined critically. On page 122, Harris and Simmons described Crotalus ruber monserratensis. The "diagnosis" they present is extremely vague, using phrases such as "smaller head," "higher number of body blotches," and "lower number of subcaudals," none of which, of course, will serve to distinguish C. r. monserratensis from any other subspecies within the species. In this instance, Harris and Simmons have occupied the name C. r. monserratensis but have presented a diagnosis so vague that they have, in fact, produced a nomen dubium.

The other two "abbreviated descriptions" of new subspecies (those of Sistrurus ravus brunneus and S. r. lutescens) are similarly poorly executed and will be discussed in a revision of this species by Jonathan Campbell.

Several comments are necessitated concerning the resurrection by Harris and Simmons of three subspecific names in the genus Crotalus. First of all, they resurrect C. horridus atricaudatus from the synonymy of the species but provide no rationale for doing so, while citing in their synonymy of this taxon the paper by Pisani, Collins, and Edwards (1973) which substantiated the relegation of the name atricaudatus to the synonymy of the nominate (and only other) subspecies.

A similar situation involved the resurrection of C. ruber elegans from the synonymy of C. r. ruber. Harris and Simmons again used vague statements to substantiate their position. They stated that "these snakes (C. r. elegans) are stunted as compared to C. r. ruber from the mainland and differ in some meristic characters." They also indicated that "these differences will be treated at length in a future paper." We are of the opinion that there is no reason whatsoever that the resurrection of C. r. elegans should have been mentioned in the paper under review. It is not therein substantiated and the matter should have been left to be treated in the "future paper."

The rationale for the resurrection of C. triseriatus anahuacus is similarly vague. They stated that members of this subspecies are "dark" and have "the blotches reduced to spots." One would have to be intimately familiar with Crotalus triseriatus to understand what their statements mean. It is our strong opinion that no taxon should be resurrected without an adequate substantiation of the reasons for so doing.

Harris and Simmons also elevated Crotalus aquilus to specific status. In doing so they stated that they may be opening a "can of worms." We agree, inasmuch as nowhere in their paper can we find any justification for this taxonomic change. The question of the relationship of Crotalus aquilus to C. triseriatus is still very much unanswered. In addition, we wish to point out that Harris and Simmons' statement (p. 105) about the "paratypic series" of Crotalus aquilus containing three species, C. pricei, C. triseriatus, and C. aquilus, is misleading. Klauber (1952) designated only a holotype for C. aquilus. In addition, he also listed a series of 41 specimens as a topotypic series and had at his disposal other specimens from other areas of the range. It appears that Harris and Simmons have confused the meaning of the terms topotype, paratype, and hypodigm.

Another matter of concern with respect to this paper, as well as another paper by Harris and Simmons, is their designation of material in their joint private collection as type specimens. The holotypes of both Crotalus ruber monserratensis and C. triseriatus quadrangularis are specimens in the Harris-Simmons private collection. We consider this to be a very inadvisable procedure which should be discontinued. Type material of any taxon ought to be placed in a permanent museum collection, given the notorious impermanence and/or inaccessibility of private collections (a case in point - the E. Ross Allen-Wilfred T. Neil collection from Belize). They followed the same procedure in another recently published paper (Harris and Simmons, 1978), wherein they described C. durissus trigonicus and named as holotype a specimen in their private collection. We would like to suggest that it would be appropriate for Harris and Simmons to deposit the type material in their private collection in a permanent collection and to use the pages of the Bulletin of the Maryland Herpetological Society to publish the new numbers.

The case of C. durissus trigonicus is especially interesting inasmuch as they chose to designate as holotype a specimen in a private collection with vague locality data and no collector's name, whereas they cite as paratypes specimens in the Florida State Museum collections with precise locality data and collectors' names available (Allen and Neill, 1957). Inasmuch as the data accompanying this holotype is very vague, we wonder if the specimens were purchased from an animal dealer and, if so, why was it designated as holotype when museum material was available? Furthermore, the diagnosis of C. d. trigonicus is poorly drawn. They use two characters of pattern (plus the stunted size) to diagnose this subspecies. One character, that of the pale triangular mark on the supraoculars, is shared with some specimens of C. d. dryinus. The other character, that of the white-tipped scales bordering the dorsal rhombs, is not faithfully translated from the information on color in life provided by Allen and Neill (1957). The latter authors stated that the dorsal rhombs are "bordered by yellow- or white-tipped scales" (underline ours). Allen and Neill (1975) provided a good description of the stunted savanna form but chose not to name it. Harris and Simmons, with scant more information (that provided by the holotype discussed above) than that available to Allen and Neill, chose to do so, using vague and non-discriminatory characters, while acknowledging that a "final" appraisal of the species is not yet available. We would like to suggest that improvement in our knowledge of the systematics of Crotalus durissus will not come from continued descriptions as subspecies of material from isolated populations, but rather will come from a study of the available material from the length of the range.

On page 135 of the "preliminary account of the rattlesnakes" they describe a new subspecies of Sistrurus ravus, S. r. brunneus, from central Oaxaca. Their photograph (their fig. 87) of "S. r. brunneus,"

however, is of a specimen from "near Huajuapan, Oaxaca," which locality lies within the range of the nominate subspecies (as evidenced by their map 31). Such carelessness is inexcusable, inasmuch as the photograph is part of the description of a new taxon. In addition, we wonder upon what basis Harris and Simmons mapped the range of a subspecies (S. ravus subsp. from Guerrero) being described by someone else?

Some minor errors require discussion, most of whch are indicative of the lack of proper review process. We are dubious about the value of reprinting the abbreviated synonymies provided by Harris and Simmons, information already available elsewhere (in the 1956 and 1972 editions of Klauber's rattlesnake monograph), but if they wish to do so, they ought to transcribe the information correctly. A case in point is the synonymy they provide for Crotalus viridis concolor. Either they should have cited Klauber's 1930 description of Crotalus confluentus decolor, an important component of the synonymy of C. v. concolor, or have made the synonymy consistent with that used for most of the other taxa listed.

In an editor's note on the contents page of the issue of the Bulletin of the Maryland Herpetological Society containing Harris and Simmons' "preliminary account of the rattlesnakes," the editor (Harris) mentioned two specimens of Crotalus tigris from Isla Tiburon, Gulf of California, which constitute a new insular record for the species. The specimens were collected during the period of September-October 1976. Harris cited the numbers of the specimens as USNM 093591 and 093692. These numbers are not permanent museum numbers, but are rather field numbers, inasmuch as the USNM permanent numbers at that time were over 150,000, and their proper status should have been so stated.

In so little prose as is present in Harris and Simmons' "preliminary account of the rattlesnakes," one would expect a greater degree of attention to syntax. For example, what is a "nominate species" (p. 105)? Also, they stated that "this snake (Crotalus aquilus) is intermediate in many characters between C. triseriatus and C. lepidus, but is as different (from what?) as they are from each other." And again, C. triseriatus anahuacus "describes the high elevation montane form occurring on all the peaks across the Volcanic Axis of Mexico (in) being dark...." "At this time, the list reflects our current understanding..." is redundant. The second "sentence" of the Acknowledgments section is incomplete. Latin is a proper noun (p. 211, paragraph 3). The statement "Angela Czarnowsky deserves credit for her many drafts of this manuscript" suggests that Angela, not Harris and Simmons, wrote the paper under review. And finally, the statement "Geneva Ambrose and my daughter, Karin Sue Harris also deserve thanks for the many long hours spent away in connection with this paper" suggests that the two ladies were either sent away or stayed away voluntarily so that Harris and Simmons could write the paper. Incidentally, in a coauthored paper "my daughter" should be "the daughter of the senior author" or something similar. This last comment, as well as similar references to "my measurements" (p. 308) and "I would like to thank" (p. 310) in the paper describing C. durissus trigonicus raises the question as to which of the authors, Harris or Simmons, actually wrote these papers.

The "preliminary account of the rattlesnakes" occupies 106 pages of issue number 3 of volume 14 of the Bulletin of the Maryland Herpetological Society, but, in fact, provides very little information not already available elsewhere. The bulk of the paper consists of abbreviated synonymies, photographs, and distribution maps of the rattlesnake taxa, most of which information is in Klauber's (1972) rattlesnake monograph. For example, each species' distribution is mapped, but the maps are primarily copies of Klauber's (1972) maps. In addition, each species is mapped separately, occupying thereby far more space than is warranted by their value. Harris and Simmons have used 31 maps to convey essentially the same information Klauber provided in 10 maps. We also wonder if the University of California Press might not have a legitimate complaint concerning this extensive use of copyrighted material. The same remark regarding the lack of new information might be directed toward two other Harris and Simmons offerings. In 1972, they published two papers on Crotalus durissus, which also contain almost no new information and are taken essentially from Hoge (1966) and Peters and Orejas-Miranda (1970). In the key (1972b) they stated that the characters given by Peters and Orejas-Miranda (1970) are difficult to use in practice, then proceed to use basically the same characters, only slightly rearranged.

We are concerned about the apparently presumptuous attitude evinced by Harris and Simmons toward other previous students of rattlesnakes. The main paper herein under review is entitled "A preliminary account of the rattlesnakes...." One is left to wonder what status is accorded to Howard Gloyd (1940) and Laurence Klauber's (esp. 1956, 1972) monumental works on this group. In another instance, Harris and Simmons (1977) purport to have presented "a preliminary account of insular rattlesnake populations, with special reference to those occurring in the Gulf of California and off the Pacific coast." This can hardly be considered a preliminary work, however, inasmuch as our modern knowledge of the distribution of insular rattlesnakes dates back to at least as far as Schmidt (1922). Since that time, several other authors have summarized information regarding the distribution of rattlesnakes on the islands of the Gulf of California (e.g., Cliff, 1954; Soule and Sloan, 1966) or both those of the Gulf islands and those on the Pacific side of the peninsula of Baja California (Klauber, 1972). In addition, this Harris and Simmons paper of 19 pages provides little new information. In fact, they cite only two insular records that were not previously cited in papers by Cliff (1954), Soule and Sloan (1966), Hardy and McDiarmid (1969), and Klauber (1972). Finally, in their description of C. durissus trigonicus they stated that "Klauber (1972) in his revised edition of the 'Rattlesnakes' did not apparently understand Hoge's (1966) work, and did not recognize his revision of the South American C. durissus." In point of fact, Klauber (1972), in an extensive footnote (p. 35), presented his reasons for not including Hoge's taxonomic changes within Crotalus durissus in stating that "it appears to me that Hoge's work is not sufficiently complete and detailed to permit the segregation and differentiation of these 8 subspecies and therefore I have not deemed it advisable to give them full recognition and acceptance for inclusion in the list of species contained in Chapter 1, or in the checklist, synonymies, maps, and keys contained in Chapter 2." We agree entirely with Klauber's (1972) assessment of Hoge's (1966) work and, furthermore, consider Harris and Simmons' statement quoted above to constitute an affront to the memory of a herpetologist whose stature in the history of not only the study of rattlesnake biology, but of the herpetology of the western United States and Mexico as a whole, is unquestionable. Along these same lines, the statement that Harris and Simmons "are currently evaluating the taxonomy and distributions of all rattlesnake species using all available taxonomic techniques" (underlines ours) is similarly presumptive. Certainly the work they have produced to date on rattlesnakes would not indicate that they are using all available taxonomic techniques. The implication of the statements quoted above is that Klauber, at his death, left the taxonomy of rattlesnakes in such a sorry state that there is a need on

Harris and Simmons' part for a comprehensive study of the taxonomy of the rattlesnakes, which is simply not the case.

It is obvious that the major paper herein under review did not go through a proper review process prior to its publication. We cannot believe that the taxonomic and nomenclatural errors committed or the various unprofessional statements included would have ever survived review by a herpetologist. Furthermore, in view of the amount of duplicated information included, it is extremely unlikely that the paper, in its present form, would have ever seen the light of day in any other than a journal essentially under the editorial control of one of the authors. Placing a date received and a date accepted at the end of the paper was a nice touch and thereby implicates one or all of the four herpetologists listed on the contents page as reviewers for volume 14 as having reviewed this paper, but we doubt very much that the manuscript ever left Harris and/or Simmons' desk.

We feel that we have raised some points of considerable concern with respect to the role of regional herpetological publications in systematic herpetology. We offer the following suggestions that can serve as guidelines not only for the Bulletin of the Maryland Herpetological Society but for regional journals in general, viz:

1. Descriptions of new taxa should not be published in regional herpetological journals but should be submitted to journals with a national and/or international scope, wherein they can be subjected to proper peer review and maintained for posterity.

2. A peer review process should be instituted for all taxonomic papers submitted to regional herpetological journals, including submission of papers for review to at least one recognized authority not directly connected to the journal in question.

3. By all means, the internationally accepted rules of zoological nomenclature as printed in the International Code of Zoological Nomenclature should be followed, regardless of the nature of the paper being published.

We have undertaken this review in the hopes that the kind of errors discussed above will be avoided in the future.

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JAMES R. MCCRANIE, 10770 S. W. 164th Street, Miami, Florida 33157 and LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, Florida 33176.

Regional Society News

The Australasian Affiliation of Herpetological Societies

The Affiliation was formally established in 1977 to encourage the scientific study of amphibians and reptiles, and their habitats, to publish the journal Herpetofauna, to promote liaison between the member societies through conventions, publications and field work, and to represent the interests of its member societies.

It is a non-profit organization with the prime executive purpose of pooling the publishing resources of herpetological societies in the Australasian Region. Five societies have to date joined the Affiliation (four in Australia and one in New Zealand); there are two other herpetological societies in the Region and they have been invited to participate.

PUBLICATIONS

Member societies bulk subscribe to Herpetofauna on behalf of their members, and it is posted out direct. Overseas and Australasian herpetologists who do not belong to one of the affiliated societies can subscribe direct to the Affiliation. An Australasian herp keepers manual is in preparation and other special Regional publications are planned.

CONVENTIONS

In April 1978, the first very successful four day convention was held at Wilcannia in far western New South Wales. Sixteen delegates attended from Adelaide, Melbourne and Sydney; the seminar sessions and field work were most productive. Many common problems were resolved and a fruitful exchange of ideas occurred.

The next convention will be at Whyalla in South Australia during March 1979.

INVITATION

Overseas and Australasian herpetologists who do not now receive Herpetofauna are invited to subscribe directly to the Affiliation (use application below). Back issues are also available.

The Editor
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The Australasian Affiliation of
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The Australian Society of Herpetologists

The Australian Society of Herpetologists is a scientific organization whose aims are to promote the study and conservation of amphibians and reptiles. Membership is open to professional scientists and scientifically-interested amateurs who are engaged in some aspect of herpetological research.

The Society publishes a Newsletter two to three times a year. The Newsletter contains news of members, lists of recent literature relevant to Australian herpetology, and other items of general herpetological interest. The Society also encourages dissemination of information among members by means of regular meetings, usually held in conjunction with the meetings of The Australian and New Zealand Association for the Advancement of Science.

Subscription to the Society is $A2.00 per annum (two Australian dollars). Overseas subscriptions should be in the form of a bank draft or cheque; personal cheques are not acceptable. The subscription covers membership dues and receipt of the Newsletter.

Application for membership, accompanied by a cheque for $A2.00 (International cheque please), should be forwarded to:

Margaret Davies, Secretary-Treasurer
Department of Zoology
University of Adelaide
North Terrace
Adelaide, South Australia
Australia 5000

Legislative Alert

Animal Dealer Fined

A south Florida animal dealer has been fined $5,000 for selling four indigo snakes. John P. Anthony, Coral Gables, was arrested on the charge that he shipped the snakes to a Michigan address in violation of federal regulations.

The Eastern indigo snake, a favorite with collectors throughout the United States, is considered a threatened species.

Indigos are now found only in Florida and Georgia. Its range once included Alabama, Mississippi, and South Carolina, but there have been no confirmed sightings of the snake in these states since the 1950's.

Commercial trade by pet dealers is believed to be the main cause for the decline of the species. Eastern indigo snakes are extremely docile, colorful, and grow as long as eight feet, making them highly desirable as pets to snake fanciers. Prime specimens sell for as much as $250 in the Northwest.

...from Florida Wildlife, November-December 1978.

Alligator Smuggling Investigation Concluded

Jail sentences and fines totaling $87,500 for three men and three corporations have resulted from a major wildlife law enforcement case involving the illegal commercialization of more than 2,500 hides of Endangered American alligators (Alligator mississippiensis).

Jacques Klapisch was sentenced November 17th in the U.S. District Court, Eastern District of New York, to 4 months imprisonment and fined $10,000 on one count of conspiracy to violate the Lacey Act. Klapisch illegally purchased the skins in the Southeastern United States, transported them to New York, and shipped them to tanneries in Japan and France.

Meg Import Corporation was fined $39,000 on 12 counts of violating the Lacey Act by shipping hides out of the U.S. using false and fictitious documents. Collaborators Egawa International and Gunze, also New York import/export firms, were fined $12,500 and $21,000, respectively, for their involvement in the smuggling operation. William Greenblatt and Kiyoshi Egawa each received $2,500 fines, and John Kelley was sentenced to 4 months in jail.

The convictions resulted from investigations conducted by special agents of the U.S. Fish and Wildlife Service and U.S. Customs Service since 1974.

...from Endangered Species Tech. Bull., 3(2): 12(1978).

Proposition Herptile

The following excerpted from the Los Angeles Times, 23 Sept. 1977, Part II, Page 6:

California Governor Brown vetoed a bill to extend until 1980 permission to import meat from pen-reared green sea turtles from Grand Cayman Is. In doing so, Brown stated, "Green sea turtles make soup, steak, pretty shells and cosmetic oil. Once there were tens of millions, now there are only thousands making their mysterious voyage through the seas from nesting beaches to distant feeding grounds. Some say farming green sea turtles in captivity will bring them back. Others see such commercial ventures as just expanding the appetite for this threatened creature. I incline to the latter and believe what turtles need is less people taking their eggs and depleting their species."



Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Standard Common and Current Scientific Names for North American Amphibians and Reptiles (Collins, Huheey, Knight and Smith, 1978). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Department of Biology, Virginia Commonwealth University, Richmond, Virginia 23284. Short manuscripts are only acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

CAUDATA

AMBYSTOMA ANNULATUM (Ringed Salamander). USA. OKLAHOMA: McCurtain Co., 2.4 km N Garvin (T7S, R23N, Sec. 6); 2 April 1977. R. Justice, S. Minter. Verified by S. Minter, R. W. VanDevender. Oklahoma St. Univ. Mus. OSUM A4963. Range extension of approximately 193 km S of specimen collected 14.5 km NE Sallisaw, Sequoyah Co., Oklahoma (Anderson, J. D., 1965. Cat. Amer. Amph. Rept., 191). Represents a McCurtain Co. record and a first record for the Gulf Coastal Plain.

Submitted by STEPHEN MINTER, Rt. 2, Box 27A, Stillwater, Oklahoma 74074. ●

AMBYSTOMA TALPOIDEUM (Mole Salamander). USA. NORTH CAROLINA: Alleghany Co., approximately 5 km NW Cherry Lane: approximately 13 km south of Virginia border on the Blue Ridge Parkway. 30 March 1978. C. Erwin and T. Newcomb. Verified by E. E. Brown, Davidson College Bio. Dept. Private collection of E. E. Brown; will be donated to North Carolina St. Mus. Nat. Hist. Gravid female collected from bottom of shallow woodland pool; layed two egg masses in captivity on following night, a month later than any previously recorded breeding activity. First record for county and extends range 100 km NE of any previously recorded localities (Cooper, Robinson, and Funderburg, 1977, Endangered and Threatened Plants and Animals of North Carolina, N. C. State Museum of Natural History, Raleigh, pp. 318-19).

Submitted by CHARLES ERWIN, c/o Department of Biology, Davidson College, Davidson, North Carolina 28036. ●

PLETHODON DORSALIS (Zigzag Salamander). USA. LOUISIANA: West Feliciana Par.: Tunica Hills Nature Preserve, 3.6 airline km W Weyanoke. 25 February 1978, 11 March 1978. A. J. Meier. Louisiana St. Univ. Mus. Zool., LSUMZ 35382-35383. First record from Louisiana. Extends range 322 airline km SW isolated Winston Co., Mississippi, record (Ferguson and Rhodes, 1958, Herpetologica 14: 129) and 322 airline km WSW isolated Clarke co., Alabama, record (Blaney and Relyea, 1967, Herpetologica 23: 246-247), both of which are in the Tombigbee River drainage. The Louisiana locality lies in the Bluffflands, a narrow band of deeply dissected, hardwood-covered loessial hills that forms the eastern border of the lower Mississippi Valley. The specimens were collected beneath relatively small logs on a natural terrace near the bottom of a deep ravine. The habitat is similar to that depicted by Blaney and Relyea (op. cit., Fig. 1).

Submitted by DOUGLAS A. ROSSMAN, Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70893, and ALBERT J. MEIER, 6165 Chandler Drive, Baton Rouge, Louisiana 70808. ●

ANURA

GASTROPHRYNE CAROLINENSIS (Eastern Narrow Mouth Toad). USA. MISSOURI: Callaway Co: 2 km SW Reform. 13 September, 1975. S. Femmer, D. Metter, P. Brown. D. E. Metter, Univ. of Missouri Zool., UMC 1078A. First record north of the Missouri River in Missouri (Johnson, T. R. 1977. Amphibians of Missouri. UKMNH publ. ser. 6, 134 p.).

Submitted by STEVE FEMMER and DEAN METTER, Zoology Department, University of Missouri, Columbia, MO 65211. ●

BUFO COGNATUS (Great Plains Toad). USA. MISSOURI: Cooper Co: 3 km N Wooldridge, Missouri River valley. 20 April 1976. S. Femmer, D. Metter. D. E. Metter, Univ. of Missouri Zool., UMC 61A. Carroll Co: 1 km E Miami Station, Missouri River valley. 24 June 1977. S. Femmer, P. Brown. D. E. Metter, Univ. of Missouri Zool., UMC 78A. First record for the counties. No evidence of a continuous range in Central Missouri (Johnson, T. R. 1977. Amphibians of Missouri. UKMNH publ. ser. 6, 134 p.).

Submitted by STEVE FEMMER and DEAN METTER, Zoology Department, University of Missouri, Columbia, MO 65211. ●

SCAPHIOPUS BOMBIFRONS (Plains Spacefoot). USA. MISSOURI: Cooper Co: 3 km N Wooldridge, Missouri River valley. 25 May 1975. S. Femmer, D. Metter, P. Brown. D. E. Metter, Univ. of Missouri Zool., UMC 58A. Osage Co: 4 km E Chamois, Hwy 100, Missouri River valley. 19 April 1976. S. Femmer. D. E. Metter, Univ. of Missouri Zool., UMC 64A. Franklin Co: 1 km E Berger, Hwy B, Missouri River valley. 19 April 1976. S. Femmer. D. E. Metter, Univ. of Missouri Zool., UMC 63A. St. Louis Co: 4 km W Chesterfield, service rd. of Hwy 40-61, Missouri River valley. 6 Aug. 1975. S. Femmer. D. E. Metter, Univ. of Missouri Zool., UMC 30A. Saline Co: 2 km E Glasgow, Missouri River valley. 6 May 1977. S. Femmer. D. E. Metter, Univ. of Missouri Zool., UMC 79A. St. Charles Co: 6 km ESE Portage Des Sioux, confluence of Mississippi, Missouri River valleys. 5 Aug. 1975. S. Femmer. D. E. Metter, Univ. of Missouri Zool., UMC 23A. New record for these counties extending the range from Central Missouri to the banks of the Mississippi River (Johnson, T. R. 1977. Amphibians of Missouri. UKMNH publ. ser. 6, 134 p.).

Submitted by STEVE FEMMER and DEAN METTER, Zoology Department, University of Missouri, Columbia, MO 65211. ●

RANA SYLVATICA (Wood frog). USA. ARKANSAS: Newton Co: Indian Creek, 10 km NW Jasper (S14, T16N, R22W). 23 August 1978. J. C. Godwin. Verified by M. V. Plummer. Harding College Department of Biology, HCDB1671. New county record and narrows the gap between western and eastern populations in the Arkansas Ozarks (Dowling, 1957, Occas. Pap. Univ. Arkansas Mus. 3: 1-51; Schuier, et al., 1972, Proc. Arkansas Acad. Sci. 26: 61-66; Robison and Douglas, 1977, SSAR Herp. Review 8: 13).

Submitted by MICHAEL V. PLUMMER and JAMES C. GODWIN, Department of Biology, Harding College, Searcy, Arkansas 72143. ●

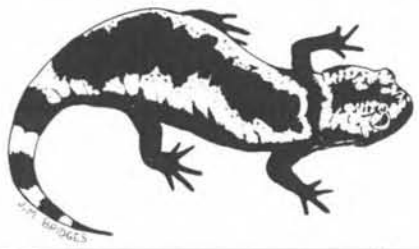
SERPENTES

ERIDIPHAS SLEVINI. MEXICO: Baja California Sur: 12.2 km S (by Mexican hwy. 1) San Ignacio. 7 May 1978. R. L. Seib. Calif. Acad. Sci., No. 146499. Extends range 220 km NW Loreto, nearest recorded locality (Leviton and Tanner, 1960, Occ. Pap. Calif. Acad. Sci. No. 27). Contrary to Tanner (1966, Trans. San Diego Soc. Nat. Hist. 14: 189-196), Eridiphas does not require streamside habitats. The nearest permanent water to the above specimen is at San Ignacio. Another specimen, R. L. Sieb, Calif. Acad. Sci., No 146498, was found 28.8 km NW (by Mexican hwy. 1) Santa Rosalia, site of nearest permanent water to this specimen.

Submitted by ROBERT L. SEIB, Museum of Vertebrate Zoology, University of California, Berkeley, California 94720. ●

THAMNOPHIS CYRTOPSIS CYRTOPSIS (Western Blackneck Garter Snake). USA. NEW MEXICO: Sierra Co: Ash Canyon, 1.25 km SSE Elephant Butte. 26 July 1978. A. H. Price. New Mexico St. Univ. collection, NMSU 5462. Conant (1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton-Mifflin, Boston) shows a hiatus for this subspecies in the Rio Grande valley from north of Albuquerque to the southern border of the state, apparently using the 5000 ft. contour level as the eastern and western distributional boundaries in the valley. Furthermore, a survey of 30 museums holding herpetological specimens from the area reported here (available from the U. S. Bureau of Land Management District Office, Las Cruces) reveals no specimens of this snake. The nearest published localities for this subspecies (Milstead, 1953, Texas J. Sci. 5(3): 348-79) are 66.7 km NW and 106.7 km NE of the one reported here. This specimen establishes the presence of T. c. cyrtopsis in the Rio Grande valley near the southern end of Elephant Butte Lake, 26.0 km west and 21.5 km east of the 5000 ft. contour level at an elevation of approximately 4300 ft.

Submitted by ANDREW H. PRICE, Department of Biology, New Mexico State University, Las Cruces, New Mexico 88003. ●



HERPETOLOGICAL RECORDS FROM NORTHWESTERN OKLAHOMA

During the course of field studies since January 1971, numerous county and other distribution records have been accumulated from northwestern Oklahoma. The following records supplement Webb (1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Specimens are in the collection of the author (RLL) unless otherwise stated.

TESTUDINES

Chelydra serpentina serpentina (Common Snapping Turtle). Ellis Co: 2.5 km N Fargo, 28 June 1975 (RLL uncatalogued). Garfield Co: Vance AFB housing area, Enid, 3 July 1971 (RLL 715). Kay Co: 10 km NW Braman, 6 Aug. 1976. L. Miller (RLL live). Logan Co: 12.2 km NW Mulhall, 23 May 1975 (RLL 1293). Chrysemys scripta elegans (Red-eared Slider). Ellis Co: 2.5 km N Fargo, 28 June 1975 (RLL live). Blaine Co: 2.4 km N Canton, Canton Lake dam, 9 June 1978 (RLL uncatalogued). Garfield Co: 4.5 km S Enid, 10 June 1971 (RLL 739). Kay Co: 6.1 km S Kilgore, 19 Aug. 1973 (RLL 886). Logan Co: North side Mulhall, 23 May 1975 (RLL 1288). Major Co: 2 km S Fairview, 18 June 1978 (uncatalogued). Graptemys pseudogeographica ouachitensis (Ouachita Map Turtle). Kay Co: 10 km NW Braman, 5 Aug. 1978, L. Miller (RLL 1440). Kinosternon flavescens flavescens (Yellow Mud Turtle). Grant Co: 16 km N Nash, April 1977 (RLL live). Kingfisher Co: 6.5 km NE Hennessey, 17 May 1974 (RLL 1079). Logan Co: 4 km N Mulhall, 26 May 1975 (RLL 1294). Terrapene carolina triunguis (Three-toed Box Turtle). Garfield Co: 4.8 km E Covington, May 1977 (RLL live). Logan Co: 10.5 km W Mulhall, 28 May 1973 (RLL live). Noble Co: 7.8 km S Perry, 16 May 1973 (RLL 1066). Terrapene ornata ornata (Ornate Box Turtle). Ellis Co: 3.1 km N Fargo (RLL 1323). Trionyx spiniferus hartwegi (Western Spiny Softshell). Garfield Co: 1.7 km S Imo, 30 May 1971 (RLL 716). Kay Co: 10.5 km E Kildare, 19 Aug. 1973 (RLL live).

SAURIA

Cnemidophorus sexlineatus viridis (Prairie-lined Racerunner). Ellis Co: 17 km S Fargo, 28 June 1975 (RLL uncatalogued). Crotaphytus collaris collaris (Eastern Collared Lizard). Garfield Co: 9.5 km E Bison, 4 May 1974 (RLL 1084); 9.5 km SE Covington, 9 July 972 (RLL 779). Eumeces fasciatus (Five-lined Skink). Garfield Co: 11 km SE Covington, 12 May 1973 (RLL 874). Eumeces obsoletus (Great Plains Skink). Garfield Co: 12.5 km SE Covington, 2 July 1972 (RLL 864). Major Co: 17.5 km W Fairview, 13 May 1978 (RLL uncatalogued). Holbrookia maculata maculata x perspicua (Lesser Earless Lizard). Garfield Co: 9.5 km E Bison, 6 June 1976 (RLL 1419). Scincella lateralis (Ground Skink). Garfield Co: 15.4 km S Covington, 5 Aug. 1972 (RLL 801). Major Co: Williams Scout Reservation, 7.5 km SE Cleo Springs, June 1978 (RLL uncatalogued). Ophisaurus attenuatus attenuatus (Western Slender Glass Lizard). Garfield Co: 10.5 km W Enid, 28 May 1972 (RLL 785). Major Co: 7.5 km SE Cleo Springs, June 1976, Don Loving (RLL 1410, 1411). Scheloporus undulatus garmani (Northern Prairie Lizard). Ellis Co: 1.9 km N Fargo, 28 June 1975 (RLL 1365). Garfield Co: 10.5 km W Enid, 26 March 1972 (RLL 755).

SERPENTES

Arizona elegans elegans (Kansas Glossy Snake). Ellis Co: 1.9 km N. Fargo, 28 June 1975 (RLL uncatalogued). Garfield Co: 8.5 km SW Drummond, 2 June 1972 (RLL 757). Major Co: 6.9 km E Ames, 2 June 1972 (RLL uncatalogued). Coluber constrictor flaviventris (Eastern Yellowbelly Racer). Grant Co: 22 km N Nash, 10 Oct. 1976 (RLL 1555). Kingfisher Co: 4 km SW Bison, 4 June 1976 (RLL uncatalogued). Crotalus horridus (Timber Rattlesnake). Garfield Co: 11 km SE Covington, Fall 1972 (private collection of Cline Hereford Farm, skin only). Diadophis punctatus arnyi (Prairie Ringneck Snake). Garfield Co: 4.6 km SW Bison, 4 June 1972 (RLL 761). Elaphe obsoleta obsoleta (Black Rat Snake). Kingfisher Co: 10 km NW Hennessey, 4 June 1972 (RLL 822). Heterodon nasicus nasicus (Plains Hognose Snake). Garfield Co: 18.7 km E Waukomis, 19 Sept. 1975 (RLL 1385). Grant Co: 10 km N Nash, 12 Oct. 1976 (RLL 1576). Major Co: 3 km E Ames, 2 Sept. 1973 (RLL 741). Heterodon platyrhinos (Eastern Hognose Snake). Garfield Co: 2.5 km E Waukomis, 20 May 1974 (RLL 1094). Grant Co: 4.5 km SE Drury Station (Sumner Co., Kansas), just inside Oklahoma state line, 2 Aug. 1976, L. Miller (RLL 1441). Kingfisher Co: 1 km S Hennessey, 24 July 1974 (RLL 885). Hypsiglena torquata jani (Texas Night Snake). Major Co: 6.5 km W Fairview, 22 June 1974 (RLL 1036). Lampropeltis calligaster calligaster (Prairie Kingsnake). Garfield Co: Vance AFB, Enid, 16 Sept. 1972 (RLL 782). Lampropeltis getulus holbrooki (Speckled Kingsnake). Garfield Co: 9.5 km E Bison, 7 May 1974 (RLL 1037). Lampropeltis triangulum gentilis (Central Plains Milk Snake). Payne Co: 20 km W Stillwater, 24 April 1969 (OSU 3864), Oklahoma State Univ., previously misidentified as Cemophora coccinea copei (Lardie, 1976, Herp. Rev. 7(3): 124). Masticophis flagellum

flagellum x testaceus (Coachwhip). Garfield Co: 9.5 km SE Covington, 13 April 1973 (RLL 876). Masticophis flagellum testaceus (Western Coachwhip). Ellis Co: 18.5 km W Vici (In Dewey Co.), 28 June 1975 (RLL 1292). Garfield Co: 20.2 km W Douglas, 20 May 1975 (RLL 1292). Nerodia erythrogaster transversa (Blotched Water Snake). Garfield Co: Meadowlake Park, Enid, 1 May 1971 (RLL 734); 4.3 km E Covington, 6 June 1974 (RLL 1012); 10 km SW Drummond, 28 June 1976 (RLL 1409). Grant Co: 3.8 km N Nash, 28 April 1974 (RLL 1101). Nerodia rhombifera rhombifera (Diamondback Water Snake). Garfield Co: 4.2 km W Ames, 8 Sept. 1973 (RLL 1008). Opheodrys aestivus (Rough Green Snake). Garfield Co: 9.5 km SE Covington, 12 May 1975 (RLL 875). Regina grahami (Graham's Crayfish Snake). Garfield Co: Meadowlake Park, Enid, 1 May 1971 (RLL 736). Major Co: Ames, 28 June 1975 (RLL 1104); 4 km W Ames, 22 June 1974 (RLL 1454). Rhinocheilus lecontei tesselatus (Texas Longnose Snake). Major Co: 3.9 km W Ames, 2 Sept. 1973 (RLL 938). Sistrurus catenatus tergeminus (Western Massasauga). Major Co: 6.5 km W Ames, 2 Sept. 1974 (RLL 934); Williams Scout Reservation, 7.5 km SE Cleo Springs, 10 July 1976 (RLL 1611). Sistrurus catenatus tergeminus x edwardsi (Massasauga). 18.5 km W Fairview, 30 May 1978 (RLL 623, 1624). Sonora episcopa episcopa (Great Plains Ground Snake). Garfield Co: 9.5 km E Bison, 4 May 1974 (RLL 1015-1018). Storeria dekayi texana (Texas Brown Snake). Garfield Co: Vance AFB, Enid, 4 Sept. 1972 (RLL 768). Grant Co: 11.5 km S Manchester, 5 Sept. 1976 (RLL 1559). Major Co: 7.5 km SE Cleo Springs, June 1972 (RLL 775); 5.8 km W Ames, 2 Sept. 1973 (RLL 933). Thamnophis m. marcianus (Checkered Garter Snake). Grant Co: 10.4 km S Manchester, 17 Sept. 1976 (RLL 1841). Major Co: 4.2 km S Isabella, 22 June 1974 (RLL uncatalogued). Thamnophis proximus proximus x diabolicus (Western Ribbon Snake). Ellis Co: 2.5 km N Fargo, 28 June 1975 (RLL 1404). Thamnophis proximus proximus (Western Ribbon Snake). Garfield Co: 7.6 km W Enid, 28 May 1972 (RLL 789). Major Co: 4 km W Ames, 27 Sept. 1975 (RLL uncatalogued). Thamnophis sirtalis parietalis x annectens (Common Garter Snake). Major Co: 7.5 km SE Cleo Springs, June 1976, D. Loving (RLL 1410, 1411). Thamnophis sirtalis parietalis (Red-sided Garter Snake). Garfield Co: Vance AFB, Enid, 1 Aug. 1976 (RLL uncatalogued). Kay Co: 10 km NW Braman, 9 April 1977 (RLL uncatalogued). Tropidoclonion lineatum annectens (Central Lined Snake). Garfield Co: Meadowlake Park, Enid, 1 May 1972 (RLL 702); 11 km SE Covington, 21 Oct. 1973 (RLL 918); 4.2 km E Covingon, 2 June 1974 (RLL 1076). Woods Co: Alva (probable), no data (Northwestern State College, uncatalogued).

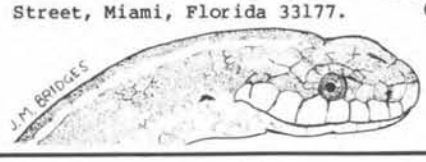
Submitted by RICHARD L. LARDIE, School of Biological Sciences, Oklahoma State University, Stillwater, Oklahoma 74074. Present address: Department of Education, Phillips University, Enid, Oklahoma 73701.

New Departmental Records for Reptiles and Amphibians From Honduras

During the course of field work in Honduras, principally dealing with a study of the dry forest herpetofauna in that country, we amassed material representing a considerable number of new departmental records. These records are reported below and supplement information supplied by Meyer and Wilson (1971, Los Angeles Co. Mus. Contrib. Sci., no. 218: 1-47; 1973, Los Angeles Co. Mus. Contrib. Sci., no. 244: 1-39), Hahn (1971, Herp. Rev., 3: 111-112), Hahn and Wilson (1976, Herp. Rev., 7: 179), Wilson, McCranie, and Porras (1978, Herp. Rev., 9: 63-64), Wilson, Myton, and Cruz (1976, Herp. Rev., 7: 179), and Wilson and Meyer (in press, The snakes of Honduras, Ralph Curtis Publications, Hollywood, Florida). All specimens are deposited in the Louisiana State University Museum of Zoology (LSUMZ).

New records: DERMOPHIS MEXICANUS. 1.0 km N Cedeno, Depto. Choluteca; 28 May 1976. LSUMZ 33568. BOLITOGLOSSA DOFLEINI. Finca Naranjito, 4.8 km N Banaderos, Depto. Cortes; 16 April 1978. LSUMZ 36591. BUFO MARINUS. 3.0 km N Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33624 BUFO VALLICEPS. 3.0 km N Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33623. HYLA STAUFFERI. 3.4 km N Jesus de Otoro, Depto. Intibuca; 2 June 1976. LSUMZ 33628. HYPOPACHUS VARIOLOSUS. 1.4 km N Jesus de Otoro, Depto. Intibuca; 2 June 1976. LSUMZ 33660. LEPTODACTYLUS LABIALIS. 3.4 km N Jesus de Otoro, Depto. Intibuca; 2 June 1976. LSUMZ 33651. PHRYNOHYAS VENULOSA. Cedeno, Depto. Choluteca; 5 June 1976. LSUMZ 33634. PHYSALAEMUS PUSTULOSUS. 3.4 km N Jesus de Otoro, Depto. Intibuca; 2 June 1976. LSUMZ 33627. SMILISCA BAUDINII. 3.4 km N Jesus de Otoro, Depto. Intibuca; 2 June 1976. LSUMZ 33631. KINOSTERNON SCORPIOIDES. 1.0 km N Cedeno, Depto. Choluteca; 29 May 1976. LSUMZ 34042. 1.4 km N Jesus de Otoro, Depto. Intibuca; 2 June 1976. LSUMZ 34043. CALLOPSIS PULCHERRIMA. Isla Zacate Grande, Depto. Valle; 9 April 1978. LSUMZ 36596. AMEIVA UNDULATA. 3.0 km N Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33696-97. ANOLIS LIMIFRONS. Mts. above Trujillo, Depto. Colon; 29 December 1972. LSUMZ 27735. BASILISCUS VITTATUS. 5.5 km S Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33688. CTENOSAURA SIMILIS. 2.7 km N Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 34039. GONATODES ALBOGULARIS. Choluteca, Depto. Choluteca; 28 May and 5 June 1976. LSUMZ 33665, 33679. GYMNOPHTHALMUS SPECIOSUS. 3.0 km N Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33664. Isla Zacate Grande, Depto. Valle; 9 April 1978. LSUMZ 36579. IGUANA IGUANA. 26.4 km N Cedeno, Depto. Choluteca; 29 May 1976. LSUMZ 33666. LEPIDOPHYMA FLAVIMACULATUM. Nr. Pito Solo, Depto. Comayagua; 18 July 1976. LSUMZ 33661. MABUYA MABOUYA. Isla Zacate Grande, Depto. Valle; 9 April 1978. LSUMZ 36578. SCELOPORUS SQUAMOSUS. 1.0 km N Cedeno, Depto. Choluteca; 28 and 29 May 1976. LSUMZ 33694-95. CONOPHIS LINEATUS. 1.0 km N Cedeno, Depto. Choluteca; 28 May 1976. LSUMZ 33563. Isla Zacate Grande, Depto. Valle; 9 April 1978. LSUMZ 36595. CRISANTOPHIS NEVERMANNI. San Lorenzo, Depto. Valle; 28 May 1976. LSUMZ 33600. 3.3 km E Jicaro Galan, Depto. Valle; 4 June 1976. LSUMZ 33576. CROTALUS DURISSUS. 8.0 km N Choluteca, Depto. Choluteca. KU 140090. DRYADOPHIS DORSALIS. 12.5 mi E Nueva Ocotepeque, Depto. Ocotepeque; 1 June 1976. LSUMZ 35310, 35315. ELAPHE FLAVIRUFA. ca. 5 km E Trujillo, Depto. Colon, 7 August 1976. LSUMZ 33565. ca. 15 km E Trujillo, Depto. Colon; 7 August 1976. LSUMZ 33542. ENULIUS FLAVITORQUES. 1.0 km N Cedeno, Depto. Choluteca; 28 May 1976. LSUMZ 33541. LEPTODEIRA ANNULATA. 3.0 km N Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33559. LEPTODEIRA NIGROFASCIATA. 14.0 km E Jicaro Galan, Depto. Valle; 4 June 1976. LSUMZ 35306. LEPTOTYPHLOPS PHENOPS. 5.5 km S Jesus de Otoro, Depto. Intibuca; 3 June 1976. LSUMZ 33595. OXYBELIS AENEUS. Isla Zacate Grande, Depto. Valle; 9 April 1978. LSUMZ 36586. RHADINAEA GODMANI. 12.5 km E Nueva Ocotepeque, Depto. Ocotepeque; 4 May 1976. LSUMZ 33567. SPILOTES PULLATUS. Trujillo, Depto.Colon; 4 May 1976. LSUMZ 33567. TANTILLA MELANOCEPHALA. 1.0 km N Cedeno, Depto. Choluteca; 28 May 1976. LSUMZ 33574. THAMNOPHIS PROXIMUS. 15.2 km N Cedeno, Depto. Choluteca; 28 May 1976. LSUMZ 33569.

Submitted by LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, Florida 33176, JAMES R. MCCRANIE, 10770 S. W. 164th Street, Miami, Florida 33157, and LOUIS PORRAS, 12120 S. W. 180th Street, Miami, Florida 33177.



Two Additions to the Reptile Fauna of Honduras, Eumeces managuae Dunn and Agkistrodon bilineatus (Gunther), with Comments on Pelamis platurus (Linnaeus)

Continuing work by the members of the Departamento de Biologia of the Universidad Nacional Autonoma de Honduras and the Direccion General de Recursos Naturales Renovables has demonstrated the presence of two additions to the known reptile fauna of Honduras. These additions, one a skink (Eumeces managuae) and the other a snake (Agkistrodon bilineatus), are discussed below. In addition, another locality is reported for Pelamis platurus, recently added to the herpetofauna of Honduras. All three specimens reported herein are deposited in the Museo de Flora y Fauna of the Universidad Nacional Autonoma de Honduras (UNAH).

Eumeces managuae Dunn

The range of the skink Eumeces managuae Dunn, 1933 was mapped by Duellman (1966), indicating a distribution encompassing a narrow strip into northwestern Costa Rica. The range also extends between lakes Managua and Nicaragua into a small area east of those lakes.

Prior to this report, the species was not known to occur in Honduras (Meyer and Wilson, 1973). In February 1977, a specimen of Eumeces managuae (UHAH 5521) was collected by Jonathan Espinosa in the yard of the Sea Farms Company in Punta Raton, a small town located on Bahia San Lorenzo, Golfo de Fonseca, Depto. Choluteca at an approximate elevation of two meters. The specimen was found under a pile of rocks in a disturbed area behind a house. This area falls within the Tropical Dry Forest formation of Holdridge (1967).

The Nicaraguan record most proximate is the airport at Managua (Jaime Villa, pers. comm.), the type locality of the species. The Honduran record represents a northward range extension of approximately 85 airline kilometers.

The Honduran specimen is a female with a total length of 245 mm (tail regenerated, but, apparently completely so) and a SVL of 95 mm. In scutellation, UNAH 5521 agrees well with the description given by Taylor (1956). There are 68 scales from parietals to above the vent, of which four are enlarged nuchals, and 17 scales around midbody.

The coloration in life may be described as follows: dorsal ground color yellowish-brown; two black paravertebral stripes beginning on the parietals and extending to the posterior limb insertion, thereafter continuing onto dorsum of tail, gradually breaking up into discrete spots; two dorsolateral stripes on each side beginning just above the ear opening and continuing to the posterior limb insertion, thereafter fusing, breaking into discrete spots, and continuing onto tail; venter immaculate white; each scale on top and sides of head with a well-defined black spot.

Agkistrodon bilineatus (Gunther)

The distribution of the cantil, Agkistrodon bilineatus (Gunther), 1863 is known to encompass the Pacific coast of Middle America from southern Sonora, Mexico to northwestern Costa Rica and the Caribbean coast in Neuvo Leon and Tamaulipas, Mexico and in the Yucatan Peninsula, including Belize (Bolanos and Montero, 1970; Burger and Robertson, 1951; Gloyd, 1972; Henderson and Hoevers, 1975). However, a recent study of the snake fauna of Honduras (Wilson and Meyer, in press) indicated that the species probably occurred in Honduras, but that no specimens had been collected.

A specimen of Agkistrodon bilineatus from Honduras (UNAH 5516) is now available. It was collected in May 1976 on the island of Zacate Grande in the department of Valle. This is the area in which the cantil has been expected to occur. The nearest records in Nicaragua and El Salvador are from ca. 16 km N Sebaco, Depto. Matagalpa (Jaime Villa, pers. comm.) and from near Sonsonate, Depto. Sonsonate (Mertens, 1952), respectively.

The Honduran specimen is a female with 130 ventrals and 45+ subcaudals (perhaps 1 to 3 subcaudals are missing from the end of the tail). The specimen is probably an adult, with a total length of 715+ mm and a tail length of 112+ mm. The lower pale line on the side of the head crosses the supralabials above the commissure and is narrowly bordered by dark pigment above and below. The upper pale line is thin and poorly developed. The ground color of the dorsum is tan, strongly contrasting with the grayish-brown crossbands. Only a few scattered white spots are present along the edges of the crossbands, mostly distributed along the lateral portions. There are 15 crossbands on the left side of the body. The venter is more-or-less uniform pale gray with few pale markings along the lateral portions of the ventral scales.

Gloyd (1972) provided characterizations of the three subspecies of A. bilineatus. Although the tail is incomplete, the extrapolated subcaudal number of 4 to 48 most closely resembles that of A. b. taylori (Gloyd, 1972, gave a count of 47 for 2 females). The count for the Honduran specimen falls below the range given for A. b. russeolus (49-61; Gloyd, 1972) and considerably below that for A. b. bilineatus (59-64; Gloyd and Conant, 1943). In the lower pale face stripe character, UNAH 5516 resembles either A. b. bilineatus or A. b. russeolus. In dorsal pattern, it resembles none of the described subspecies. Unlike A. b. bilineatus, the subspecies expected to occur in the area, this specimen has conspicuous pale interspaces between the dark dorsal crossbands, thus resembling either A. b. taylori or A. b. russeolus. However, unlike either of those two subspecies, UNAH 5516 has narrow, poorly-developed white markings along the edges of the dorsal crossbands. The ventral pattern most closely resembles that of A. b. bilineatus, as described by Gloyd (1972).

In summary, the Honduran specimen of Agkistrodon bilineatus resembles none of the described subspecies in pattern, and, in sum total, its diagnostic features do not ally it with A. b. bilineatus, the subspecies occurring along the Pacific coast of Mexico and Central America. Whether the pattern of this specimen is typical of the Honduran population or is aberrant is a question that will only be answered with the collection of additional material.

Pelamis platurus (Linnaeus)

Wilson, McCranie, and Porras (1978) recently reported the first specimens of the Yellow-bellied Sea Snake, Pelamis platurus (Linnaeus), 1766 from the territorial waters off the Pacific coast of Honduras. Those three specimens were found on the beach at Cedeno, Depto. Choluteca. This town lies on the shore of the southern arm of the Golfo de Fonseca.

In August, 1976 an additional specimen of P. platurus (UNAH 5518) was collected by Roberto Soto at the port of San Lorenzo, Depto. Valle, within the Bahia San Lorenzo, a bay located about midway between the upper and lower arms of the Gulf of Fonseca.

The two known localities for P. platurus in the Pacific coastal territorial waters of Honduras are approximately 25 airline kilometers apart and firmly demonstrate the occurrence of this sea snake in the Gulf of Fonseca. The regularity of their occurrence in these waters is questionable, however. Whereas the fishermen in the town of Cedeno with whom Wilson, McCranie, and Porras talked in the summer of 1976 were familiar with this snake, they com-

mented as well upon its rarity. The old fishermen in San Lorenzo, on the other hand, had never seen the animal.

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News Notes

GOPHER TORTOISE COUNCIL

During the past several years, people in the southeastern United States have become alarmed over the decline of the gopher tortoise, Gopherus polyphemus. This concern has led to the formation of the Gopher Tortoise Council, a group having as its primary goal to assure the continued survival of viable populations of gopher tortoises throughout their natural range. At this time, the Gopher Tortoise Council is soliciting your support for the protection of this species by asking interested persons to join the council. For further information, please contact Richard Franz, Florida State Museum, University of Florida, Gainesville, Florida 32611.

ITTS JOURNAL NEEDED

Derek J. Foxwell is interested in purchasing a complete set (or individual issues) of the defunct International Turtle and Tortoise Society Journal. Anyone wishing to sell same should contact Mr. Foxwell at: Conservation Section, The City Museum, Queens Road, Bristol, B58, IRL, England.

A NEW HERP PUBLICATION

Behavior and Neurology of Lizards. Proceedings of an interdisciplinary conference sponsored by HEW's National Institute of Mental Health (NIMH) and the Smithsonian Institution's National Zoological Park. The 350-page volume was edited by Paul D. MacLean, Chief of the NIMH Laboratory of Brain Evolution and Behavior, and Neil Greenberg, of the Zoological Department of the University of Tennessee.

Contents of the volume are presented under three major headings: "Neurology," "Laboratory Studies of Behavior," and "Field Studies of Behavior." Eighteen scientific papers are included, and a summary of participants' discussion concludes each section. Also, a taxonomy of lizards is appended.

In an introductory chapter, McLean, who is the originator of the "three brains of man" concept that proposes the evolutionary history of the human brain, describes the importance to brain scientists of research on lizards. Lizards, he explains, are distant relatives of long-extinct mammal-like reptiles that are believed to have been antecedents of today's mammals. Understanding the connection between brain and behavior in the reptilian brain is thus fundamental to understanding the structure and function of the more complexly developed primate brain.

Single copies of Behavior and Neurology of Lizards may be obtained while a supply lasts by writing Public Inquiries, NIMH, Room 11-A-21, 5600 Fishers Lane, Rockville, Maryland 20857. The volume will not be available for purchase from the Government Printing Office.

SECOND INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY

The Second International Congress of Systematic and Evolutionary Biology (ICSEB-II) will be held at the University of British Columbia, Vancouver, Canada, 17-24 July 1980.

The provisional list of symposia topics include:

1. Arctic refugia and the evolution of Arctic biota.
2. Origins and evolution of the North Pacific marine biota.
3. Evolution of reproductive strategies.
4. Evolutionary epigenetics.
5. Evolution of community structure.
6. Green algae and land plant origins.
7. Macromolecular mechanisms in evolution.
8. Allozymes and evolution.
9. Coevolution and foraging strategy.
10. Evolution of colonizing species.
11. Rare species and the maintenance of gene pools.
12. Paleobiology of the Pacific rim.

Additional symposia may be included.

Sessions for contributed papers and for papers in specialized fields, taxonomic as well as methodological will also be organized.

Those interested in receiving an information circular in the spring of 1979, should write to:

Dr. G. G. E. Scudder
Department of Zoology
University of British Columbia
2075 Wesbrook Mall
Vancouver, B. C., V6T 1W5
Canada

PYTHON BREEDING MANUAL

The Phython Breeding Manual, published by the Institute for Herpetological Research, is now available. A compilation of a two year, world-wide survey on captive propagation of pythons, the Manual is divided into four sections. The first section presents specific breeding data on eighteen species of pythons, including mating, egg-laying and hatching seasons, as well as other relevent data. The second section discusses methods of inducing python breeding. The third and

fourth sections discuss techniques of python egg incubation and incubator design and construction. General recommendations and other useful information for the python breeder are also included. The cost of the Python Breeding Manual is $6.00 U.S., plus $2.50 U.S. air or $1.25 U.S. surface for mailing and handling. Address inquiries to:

Richard Ross, M.D., Director
Institute for Herpetological Research
P. O. Box 2227
Stanford, California 94305
USA

HR REPRINT POLICY CHANGE

Contributors to HR may no longer order reprints (see new editorial policy on inside back cover). In the past, reprints were supplied to contributors by simply xeroxing the amount requested. This technique was time-consuming, and was not consistent with the HR mission as a newsletter for the herpetological community. Further, contributors can produce their own reprints as cheaply as (or cheaper) than the HR staff.

MISSING HR ISSUES

If you do not receive an issue of Herp Review, DO NOT contact the editors for a replacement. Contact the Publications Secretary listed on the inside front cover.

Final Further Comments on the Calling of Common Names

Comments on "Common" Names

I am very glad to have an up-to-date list of species of amphibians and reptiles occurring in the United States and Canada, along with a list of subspecies currently recognized (SSAR Misc. Publ., Herp. Circular No. 7). The SSAR Committee on Common and Scientific Names must be congratulated for providing this service and should be encouraged to repeat it at intervals. The committee should also consider seriously the inevitable criticisms coming from those who disagree with parts of the list. It seems to me (that) thoughtful responses to the current version of the list can make subsequent versions more acceptable to those who wish to use the list, and it is in this vein that the following remarks are offered. In addition, because I am acknowledged for suggestions, corrections and criticisms, the implication might be that I find the list completely satisfactory. In fact, few of my suggestions were followed.

My criticisms fall into three areas: (1) orthography, (2) excessive contrivance of common names for taxa other than species (a practice carried over from the ASIH list) and (3) what I perceive as excessive concern that common names be "standardized."

The new list contains some abrasive (and grammatically questionable) changes in spelling. I suppose grammatical leniency in the interest of saving space encourages changes of this sort, but does not justify them. Some that made me cringe were smallmouth, blackbelly, longtail, graybelly, shovelnose, and redback salamanders and roughskin and redbelly newts. Other names fitting the same pattern were, for some reason, not shortened.

Orthographic changes are of less concern to me than the other, broader criticisms because I seldom use common names anyway and don't see the point of trying to standardize them excessively. The philosophy of the ASIH list was clearly described in its introduction: "Our selections should be considered recommendations only. These names have no official status, and their use is in no way compulsory. Workers who hold that common names have no place in scientific zoological literature may ignore them." This statement was coupled with the warning that failure to use any common names can frustrate people unfamiliar with the zoological names. We surely all understand this, but also understand that it makes no difference whatsoever in this context whether Gyrinophilus porphyriticus is called the purple salamander or the spring salamander, or whether Eurycea longicauda is called the long-tailed salamander or the longtail salamander. The really important part of these common names to people outside herpetology is the word "salamander." Names like snake, turtle, lizard, salamander and frog are truly "common" names understood by most English-speaking people. I can understand why the editor of a herpetological journal might not want an article to use the common name "spring lizard" or "ground puppy", or just "lizard," for salamander. I see no justification, however, in forcing a legalistic set of largely contrived English names, in parallel with zoological names at every taxonomic level, on either the public or on ourselves. Perhaps I have misread a mild authoritarian impulse into the SSAR list where none was intended.

My most serious criticism of the SSAR list is that it continues the practice of listing "common" names for genera and subspecies. Contrivance of English names for genera and subspecies is based, I think, on a misunderstanding of what "common" names are, and occasionally leads to absurdity and biological misunderstanding. Consider the following examples from the list: The common name for salamanders in the genus Gyrinophilus is "spring salamanders." Yet, only two of the three species in the genus are actually called spring salamanders in the list; the other is called "Tennessee cave salamander." Wouldn't it logically be called "Tennessee cave spring salamander" (heaven forbid)? Members of the genus Pseudotriton are called "red salamanders." Yet, P. ruber is called the "red salamander" and P. montanus the "mud salamander." Shouldn't P. ruber be called the "red red salamander" and P. montanus the "mud red salamander"? The common name suggested for the genus Eurycea is "brook salamanders." Yet, not one of the twelve species in the genus is called brook salamander. Does this really make sense to anyone? What is the value of these generic "common" names if no one uses them, or has to look them up in a list? The suggested names are mostly contrivances of herpetologists who seldom use them anyway. Neither the ichthyologists nor the ornithologists have found it necessary to use generic common names.

Ichthyologists and ornithologists have not found it necessary to coin common names for taxonomically recognizable geographic variation either. Use of common names for subspecies can cause the same sorts of absurdities that arise with generic common names. For example, the species Gyrinophilus palleucus is called, in the list, "Tennessee cave salamander," but none of the three recognized subspecies is. What is the utility of calling G. palleucus the "Tennessee cave salamander?" but G. p. palleucus the "pale salamander"? Other examples of this sort of thing are: no subspecies of the "eastern newt" is called eastern newt; no subspecies of the "striped chorus frog" is called striped chorus frog; no subspecies of "Gilbert's skink" is called Gilbert's skink. More importantly, it is misleading and, I think, educationally counterproductive to encourage laymen and young enthusiasts to think of subspecies as distinct "kinds" only slightly different from species, and this I believe "standardized common names" for subspecies do. We now know too much about the generic, ecological and evolutionary significance of geographic variation to encourage that kind of thinking any longer by coining an English common name for every zoological subspecies name in current use.

I hope these and other concerns about common names lists can be discussed thoroughly as future versions of the SSAR list are prepared.

RONALD A. BRANDON, Department of Zoology, Southern Illinois University at Carbondale, Carbondale, Illinois 62901.

Another View of the SSAR Common Names List

I disagree with Rossman, et al. (1978, Herp. Rev. 9(4): 146) and with Huheey (1978, Herp. Rev. 9(4): 146-7) in their main criticism of the recently published "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" (Collins, et al 1978, SSAR Herp. Circ. no. 7). The same argument opposing the use of nouns as modifying words in common names was expressed to me a few years ago to support the use of the common name "hog-nosed snake" rather than "hognose snake" for snakes of the genus Heterodon. Today most herpetologists have accepted the name "hognose snake." I find the argument by Rossman, et al., to reject this list of names less than convincing since names in previous lists have many nouns and noun forms used as modifying words.

A common name is not a description but rather a verbal symbol for a species or subspecies. "Black-headed snake," as a descriptive term, refers to any or all snakes with black heads; but "black-headed snake," used as a common name, refers to certain species of the genus Tantilla and "blackhead snake" will serve this naming function just as well. I maintain that the grammatical rules for a descriptive statement are irrelevant for a name (I am not discussing the rules for composition of a scientific name which are explicitly stated). A common name should be judged on how well it serves as a name. It should be judged for ease of remembering, distinctiveness, shortness, ease of pronunciation and ease of spelling. Whenever possible the name should include words that are logically associated with the species for ease of remembering.

The arguments expressed by Rossman, et al., for using only the hyphenated participial form do not hold up under scrutiny:

1) Hyphenated participial forms are less awkward. The context suggests that they mean awkward sounding or awkward in pronunciation. Hyphenated participial forms are not inherently less awkward. Which is more awkward to pronounce: "flat-headed snake" or "flathead snake?"

2) Hyphenated participial forms are less ambiguous to the non-herpetologist. But the meaning of a name is the species for which it stands and does not depend upon the preciseness of its descriptive words. The example cited by Rossman, et al., is trivial compared to the ambiguity of some other well-accepted common names. Should "crayfish snake" be changed to "crayfish-eating snake," "rat snake" to "rat-eating snake," etc. to avoid ambiguity? And what should be done with "fox snake" and "garter snake?"

Rossman, et al., criticize the recently published list for being inconsistent. After reading the rationale by Collins, et al. (1978, Herp. Rev. 994): 147), I do find a few inconsistencies in the application of the stated guidelines. However, the new list follows a set of guidelines more consistently than either Stebbins (1966, "A Field Guide to Western Reptiles and Amphibians") or Conant (1975, "A Field Guide to Reptiles and Amphibians of Eastern and Central North America"), authorities which Rossman, et al., recommend. Stebbins uses "hognose snake" on one page and "leaf-nosed snake" on the next. Conant uses "ringneck snake" and "rose-bellied lizard." Many other examples could be given.

I urge the adoption of this new list of standard English common names by herpetologists. I am not completely satisfied with all of the names included but I think it has much to commend it. I do not advocate eliminating the use of other colloquial names, especially in regional works, but I think it is important to also use standard names to avoid confusing the layman who finds scientific names foreign.

I also urge the Committee on Scientific and Common Names to develop a set of guidelines for standard common names utilizing criteria of effectiveness and ease of use, and then to use these guidelines in the next revision of the list rather than rules that have little relevance to the function of a name. These guidelines should include the first four guidelines in the present list (p. 1) which ensure that wherever possible the standard common name will be the same as or similar to a name in widespread use. Therefore any revision will necessarily be conservative. And I hope that future changes will be minimal because the benefits of stability, even for common names, is great. Additional guidelines might include a limit on the length of a name, guidelines for combining words in a name (why use the combination "king-snake" but not the combination "milksnake?"), elimination of the hyphenated form except where the hyphen is necessary to prevent awkward construction, elimination of the possessive form, etc.

I agree with Huheey that it makes little difference in communication whether the hyphenated participial form or the non-hyphenated noun form is used. Maybe a list of standard English common names will need to include alternative forms in order to satisfy all members of our fraternity.

The above discussion should not be taken as an argument for loose usage of the English language. I agree with Rossman, et al., that "the scientific community should support proper usage of the English language, not contribute to its deterioration." I strongly support adherence to good grammatical usage for effective and accurate communication in scientific writing. However I see no benefit in applying arbitrary rules to the formation of a proper name which rules are irrelevant to the function of that name in communication.

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An adult Ambystoma rosaceum (Tarahumara Salamander) from the state of Sonora, Mexico, collected by Darrel Frost and Michael Robinson in April 1975. Photograph by Henry Wallace.

Current Literature

As of March, 1978, approximately 87 searchers are scanning 450 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

A new feature of Current Literature is the inclusion of senior author addresses. Although only a small portion of the citations have the addresses included in this issue, it is a goal to publish addresses for a majority of the citations for Current Literature in 1979.

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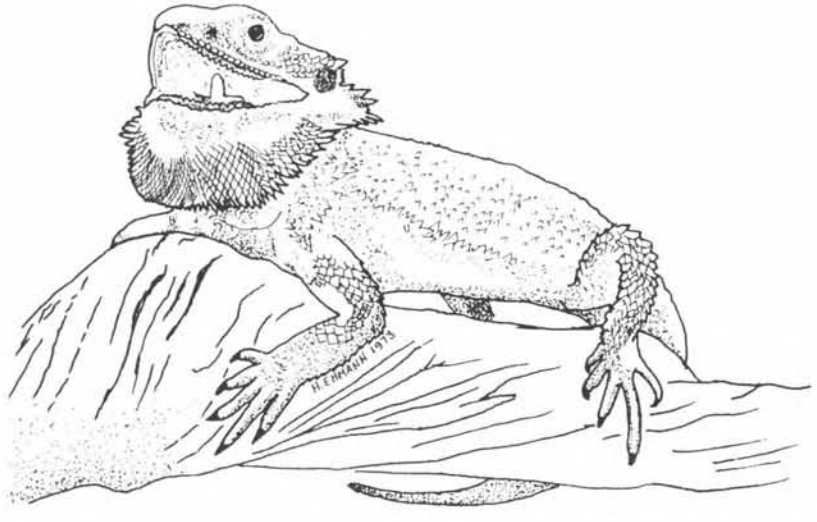
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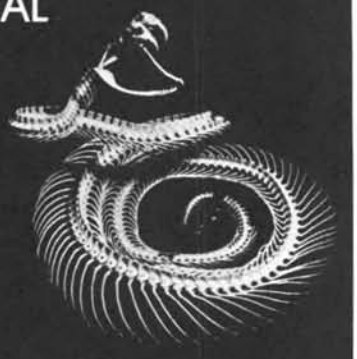
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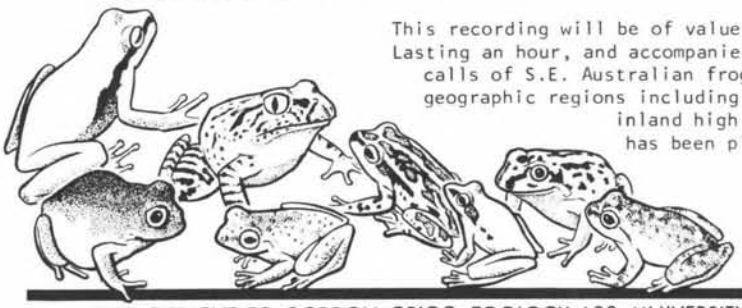


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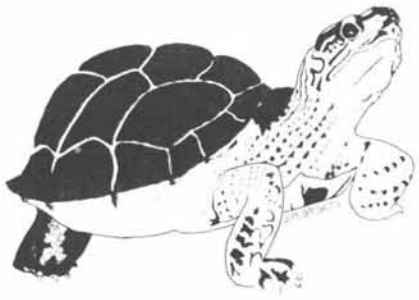
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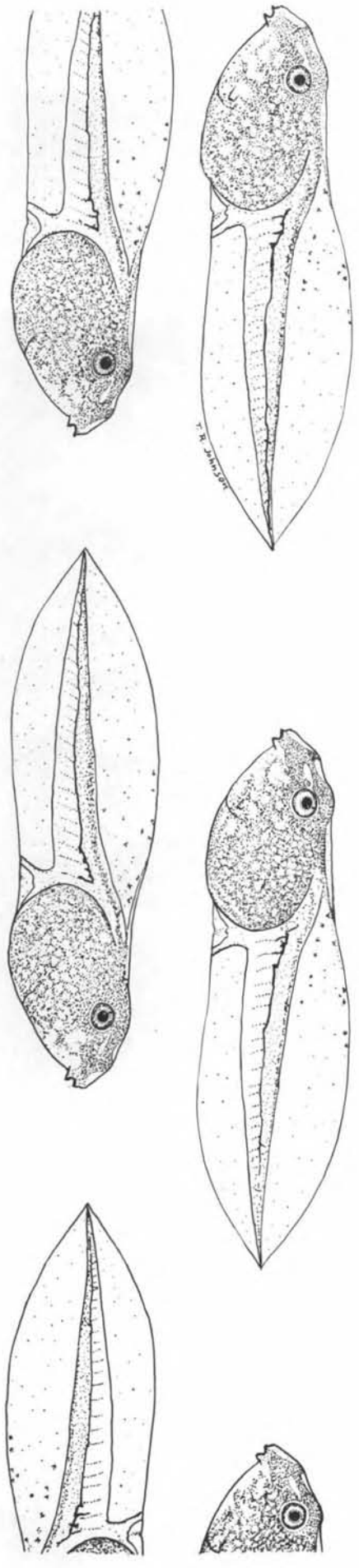
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Volume 9 **December 1978** **Number 4**

Contents

SSAR GRANTS-IN-HERPETOLOGY 126
IN MEMORIAM
Howard Kay Gloyd, by R. Conant 127
FEATURE ARTICLES
The Herpetological collections of the Strecker Museum, by D. M. Hillis 129
Australian Society of Herpetologists 130
The fourth all-union herpetology conference of the USSR, by I. S. Darevsky and N. N. Scherbak 130
Rebuttal to Smith and Kohler on introduced species, by E. M. Rundquist 131
A modification of vernier calipers for measurement of convex curved surfaces, by J. D. Miller 132
A simple trap for basking turtles, by R. D. MacCulloch and D. M. Gordon 133
SSAR BUSINESS
Minutes--Business Meeting 2 June 1978 133
1979 SSAR standing committees 134
Report of the SSAR Committee on Common and Scientific Names for 1978 134
BOOK REVIEWS
"Synopsis of the Herpetofauna of Mexico" by H. M. Smith and R. B. Smith. Reviewed by W. E. Duellman 135
"Toxicology and Pharmacology of Venoms from Poisonous Snakes" by J. H. Brown. Reviewed by H. C. Seibert 136
"Florida Frog Calls: A Guide to Commonly Heard Frogs and Toads" by R. A. Bradley. Reviewed by G. R. Pisani 137
"The Handbook of Amphibians and Reptiles of U.S.S.R." by A. Bannikov, I. Darevsky, V. Lsehenko, A. Rustamov and N. Scherback. Reviewed by G. Mamonov 137
"The Parasite Worms of Reptilians of U.S.S.R." by V. P. Sharpilo. Reviewed by G. Mamonov 137
"The Catalogue of African Desert Lizards" by N. Scherback. Reviewed by G. Mamonov 138
HERPETOLOGICAL HUSBANDRY
Growth of the cobra Naja naja (Serpentes, Elapidae), by H. Quinn and T. G. Hulsey 138
A restraining apparatus for unanesthetized snakes, by R. Ward and E. H. Harrell 139
An observation of double clutch production by Elaphe obsoleta in captivity, by H. J. Cohen 140
LEGISLATIVE ALERT
Legislative news 141
New Illinois regulation 141
California collectors cited 141
REGIONAL SOCIETY NEWS
New herp society 141
Regional herp society omitted 141
New herpetological society proposed 141
Societe Herpetologique de France 141
GEOGRAPHIC DISTRIBUTION
New records 142
Texas amphibians and reptiles: some new distributional records, part 1, by J. P. Karges 143
NEWS NOTES 145
CURRENT LITERATURE 148
ADVERTISEMENTS 160

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SSAR GRANTS-IN-HERPETOLOGY

The SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES is pleased to announce the establishment of SSAR GRANTS-IN-HERPETOLOGY, a new society program designed to provide financial support to deserving individuals or organizations engaged in research on or conservation of amphibians and reptiles. Four grants of $200 each will be available for awarding at the Annual Meeting of the SSAR. Grant proposals will be considered in the following areas: 1) HERPETOLOGY-ORIENTED CONSERVATION, 2) GRADUATE STUDENT HERPETOLOGICAL RESEARCH, 3) REGIONAL HERPETOLOGICAL SOCIETY PROGRAMS OR PROJECTS, and 4) HERPETOLOGICAL RESEARCH IN ZOOS.

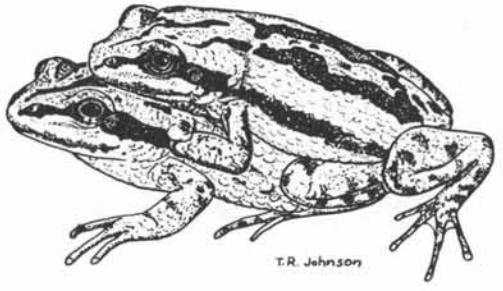
Members of the SSAR Grants-in-Herpetology Committee will evaluate all proposals, projects or programs. Committee members are: Harry W. Greene (Chairperson), C. Kenneth Dodd, Jr. (Conservation), Stephen R. Edwards (Graduate Student Research), Martin J. Rosenberg (Regional Herpetological Societies), and John Behler (Zoo Research).

All proposals must be typewritten and submitted in duplicate no later than 1 APRIL 1979 to:

Harry W. Greene
Museum of Vertebrate Zoology
University of California
Berkeley, California 94720

Individuals submitting should designate to which of the four areas their proposal applies. Additionally, proposals from graduate students, individuals representing regional herpetological societies, and individuals representing zoos should be accompanied by a letter of support from the institution or regional society represented. All proposals should be brief (2-3 typed pages), and should include a statement of the problem, objectives and methods.

Participation in this SSAR program is limited to SSAR members regardless of sex, race, creed, or religious affiliation.



In Memoriam

HOWARD KAY GLOYD
1902-1978

A warm, cherished friendship that flourished for almost half a century terminated on August 7, 1978, with the death of Howard K. Gloyd, fondly known as "H. K." to his many friends and associates.

It began in 1929 when a callow youth with an enthusiasm for reptiles and a job as a keeper in the Toledo Zoo started making pilgrimages to the University of Michigan, then widely recognized as the herpetological mecca of the United States. The persons with the great names--Ruthven, Gaige, Blanchard, and Case--were helpful and encouraging, but it was with the graduate students that I developed the greatest rapport. Howard Gloyd was preeminent among them.

How long ago that seems now and how ambitious we were in those days. All sorts of schemes and projects entered our youthful heads. H. K., ever ready to share his knowledge and enthusiasm with his friends, was then deeply involved with rattlesnakes, but that didn't deter him from also aspiring to monograph the other pit vipers, notably Agkistrodon. As our close relationship flowered, he suggested making a joint assault on that group on a worldwide basis, and I eagerly accepted. We published two short papers while he was still in school, and I, naively, remarked that perhaps the combination "Gloyd and Conant" would someday be as well-known as "Baird and Girard." He often twitted me about that, but I think he secretly hoped it just might come to pass.

Over the decades we were each other's most voluminous correspondents, we seldom missed a chance to be together, even for a few hours, and we often turned to each other, like affectionate siblings, for help and advice when the going was rough.

Howard Gloyd was born on February 12, 1902, at DeSoto, Kansas. He was an only child, and his parents were well along in years at the time. His father, Winfield Scott Gloyd who was a harness maker, was past 50 and his mother, Melvina (Skaggs) Gloyd, was nearly 46. He developed an interest in natural history at a very early age that was encouraged by his mother, who often went hiking and canoeing with young Howard and his friends. At the age of 12 he was an accomplished taxidermist; by 1918 and again in 1919 a large number of his well-mounted birds and mammals, including a swan, owl, eagle, and coyote, were prominently displayed in the window of the hardware store in Wellsville, where the family then resided. His youthful talents and



1. Howard K. Gloyd, Ph.D., Director of the Chicago Academy of Sciences, in his office in 1939.

life-long passion for field work were enthusiastically nurtured by Grace R. Meeker, the public librarian at Ottawa, Kansas, where he lived as a young man. She was a competent naturalist with a major interest in botany, especially mosses, and she, probably more than anyone, broadened H. K.'s horizons to include many facets of natural history and not just the birds, which had been his first love. He always referred to her with fondness as "Aunt Grace." His carefully prepared collection of about 200 bird study skins, incidentally, was acquired by the University of Michigan in 1930.

It was inevitable that young Gloyd would pursue a college career. His father, mindful of his own long hours and hard work, was pleased and not a little surprised to realize his scholarly son was being paid to teach at Ottawa University, the institution from which Howard received his B.Sc. in 1924. H. K. was awarded his M.S. from Kansas State College, Manhattan, in 1929, and his Ph.D. from the University of Michigan in 1937. Ottawa University presented him with an honorary D.Sc. in 1942.

Howard Gloyd's professional career can be divided conveniently into three periods: (1) his academic years and relationship with Frank Nelson Blanchard; (2) his long tenure as Director of the Chicago Academy of Sciences; and (3) his position on the faculty of the University of Arizona at Tucson.

Copperheads and rattlesnakes, as well as a wide variety of other serpents, were abundant among the rocky limestone ledges and wooded areas of eastern Kansas, but it was not until 1924 that H. K. began collecting and studying them in earnest. His intimate acquaintance with the two venomous species was the springboard for his life-long interest in pit vipers, and his meeting with Blanchard at the University of Michigan Biological Station at Douglas Lake in 1927 led eventually to the taxonomic investigations that were his forte for the remainder of his life. He described eight new forms of rattlesnakes and 11 other new pit vipers, as well as a new genus. He published 75 papers in herpetology (one will be posthumous), all of which are listed in the reprinting of his spendid work, "The Rattlesnakes" (Chicago Acad. Sci., Spec. Publ. No. 4, 1940), that will soon be available through SSAR. He also wrote 20 other papers, chiefly on birds. Four taxa, one each in the genera Crotalus, Elaphe, Heterodon, and Sonora, as well as three species of insects, bear the designation gloydi.

Blanchard was brilliant in many ways and a perfectionist and, once a person became well acquainted with him, an inspiring teacher as well. Invariably, however, one's first impression was of an austere, unfriendly man, and H. K. almost went home in disappointment despite the gracious correspondence that previously had passed between them. As a candidate for his doctoral degree, Gloyd was strongly influenced by Blanchard and was easily his most distinguished student. They developed a mutual respect that endured until Blanchard's untimely death in 1937 a few months prior to his 49th birthday.

Partly because such a work was needed and partly because of the success of Blanchard's Key to the snakes of the United States, Canada, and Lower California (Mich. Acad. Sci., Pap. 4, 1925), the two of them decided to prepare a handbook on the snakes of the same large area. Toward that end they visited many museum collections together and undertook a long field expedition, chiefly through the South and West, from September, 1935, until February, 1936. H. K. often regaled his friends with accounts of his adventures in the field with Blanchard, who was so extremely timid and un-



2. Gloyd in the field in the Southwest in 1935 in the outfit that prompted Frank N. Blanchard to call him the "dude snake hunter." H. K. loved field work and thousands of his herpetological specimens have been deposited in more than a dozen museums.

sure of himself that several ludicrous situations developed. The handbook project, unfortunately, was never completed, partly because Blanchard died so soon afterward, and Gloyd, late in 1936, had accepted the position as Director of the Chicago Academy of Sciences.

I admired H. K. for all he did at Chicago despite the many difficulties he had to face and the slender resources at his disposal. The Academy, although it had a long tradition as a respected scientific institution, was tiny compared with the massive Field Museum, and it had little financial support from local citizens, many of whom thought one natural history museum was enough. Funds were always short. The staff was inadequate. He had both a board of trustees and a board of scientific governors with which to cope and whose members represented a diversity of personalities and interests. The effects of the depression years had to be endured, although help, provided through such agencies as the WPA, enabled the Academy to catch up with some of its deferred maintenance and to undertake a few new activities. One of those was printing, and with hand set type and a primitive press operated by an old-time journeyman printer, H. K. accomplished wonders. He edited and even wrote a fair portion of several journals, including the Academy's Bulletin and Special Publications, the Chicago Naturalist, and Natural History Miscellanea, the last of which he developed into a nationally recognized and widely used outlet for short papers, chiefly but not confined to herpetology. The early issues of Herpetologica were set by hand and printed at the Academy. With it all, Gloyd found time to complete his long work on the rattlesnakes, the broad nucleus of which was based on the material he had assembled while preparing his doctoral thesis at Michigan.

It was perhaps unfortunate there were two giants in the field at the same time. While Gloyd was earning an outstanding reputation for himself in the Midwest, Laurence M. Klauber was emerging as an authority on Crotalus in the West. They were always polite and exchanged information, but there was a reserve and wariness nonetheless that precluded any real friendship or collaboration. They tacitly agreed that Gloyd should handle the genus Sistrurus and the eastern species of Crotalus, whereas Klauber would concentrate on the West. Klauber's strong personal financial resources enabled him to hire whatever help he needed for his research and to do many things that were impossible for Gloyd to undertake. There was no National Science Foundation or similar large granting agency in those days.



3. Gloyd's research on the Asian species of Agkistrodon (sensu lato) occupied much of his attention during his years at the University of Arizona.

A fact often overlooked by herpetologists is that the Chicago Academy study collection is especialy rich in crotalid snakes that H. K. assembled and a large number of which he preserved and catalogued himself.

Nathan Smith Davis III, M.D., who had been President of the Chicago Academy of Sciences for 18 years, died in 1956. As so often happens when a strong leader succumbs, a new clique among the trustees gained power and basic policies were changed. Gloyd wisely avoided open conflict, and he left Chicago in 1958 to become a faculty member at the University of Arizona. He was no stranger to the Southwest to which he had repeatedly made field trips for decades. He was, in fact, very much at home and relished being in a warm climate far away from the wintry blasts from Lake Michigan. And finally, after a long struggle as an administrator, he achieved the profession for which he was most admirably suited--teaching and interpreting vertebrate zoology, zoogeography, herpetology, and natural history of the desert. He held the post of Director of the Traveling Science Institute of the Arizona Academy of Science during 1959-60, served actively on the Publications Committee of the University of Arizona Press from 1961 until 1974, and taught formal classes until he was 72. Meantime he continued his research on Agkistrodon, a project from which I had resigned in the late 50's leaving the field to him alone.

Howard Gloyd was an extremely likeable person. His friendliness and warm personality appealed to everyone, as did his subtle sense of humor. He always took time to discuss matters of mutual interest with his close friends and serious students no matter how many pressing items might be awaiting his attention. He made a host of friends during his lifetime, and he was still corresponding with some of his boyhood chums until a few months before he died.

H. K. was not all professional work and science. He had a variety of talents and interests. He was an excellent wood worker, and there are several pieces of furniture in his home that he constructed and which would be a credit to a cabinet maker. He was a fine photographer, and he developed an apparatus for portraying venomous and other snakes on a ground glass base in such a way as to eliminate all shadows. He did his own darkroom work. In a sense he invented the "snake pullman," which almost all herpetologists used for decades for transporting and shipping live reptiles. He had seen snake boxes with hinged tops, but it was he who added the extra, internal wire lid that provided a distinct safety feature. Because of his interest in firearms he at first used wooden shell boxes with their sturdy dove-tailed corners; later he designed and built many "pullmans," large and small. While he was at Ottawa University, he was bitten on the finger by a prairie rattlesnake

about 20 inches long. In the custom of the day, potassium permanganate was used as a treatment, and, as a result he suffered acute pain and tremendous swelling, but he eventually made a complete recovery. It was his first and last snake bite.

He collected firearms, chiefly hand guns, and greatly enjoyed using them. He owned a 22-caliber rifle when he was 10 years old, soon afterward acquired a short, smooth-bore pistol, and he had a shotgun when he was 13 or 14. He was adept at shooting lizards in the field.

Perhaps his favorite hobby and the one from which he derived the greatest pleasure was music. He was a percussionist and a talented one. He played drums when he was in grade and high school, was a member of the town band, and performed with musical organizations ranging from symphony orchestras to Dixieland bands. For a decade, beginning in the late 1940's, Thursday nights were the occasions for jam sessions in the basement of the Chicago Academy. There, the Academic Cats held forth with a full complement of the Dixieland instruments, and every one of the players held a Ph.D. They did so well that such musical greats as Muggsy Spanier sometimes sat in with them. Almost to the time of his death, H. K. enjoyed watching and listening to musical programs on television, such as the "Boston Pops" concerts, but it was a matter of sadness to him that his hearing had deteriorated to the point where he no longer could hear the piccolo when Sousa's rousing "Stars and Stripes Forever" was played.

Gloyd's many talents earned him numerous honors and awards. He was a member of Sigma Xi, Phi Kappa Phi, Phi Sigma, Gamma Sigma Delta, and Phi Mu Alpha (Sinfonia). He received three grants from the National Science Foundation to assist his work on Agkistrodon. He was a Fellow and Fifty-year Member of the American Association for the Advancement of Science, and he was long listed in American Men of Science and Who's Who in America. He became Professor Emeritus at the time of his retirement from the University of Arizona faculty.

In several ways H. K. was quite old-fashioned. He refused to use the two-letter designations for states recommended by the Postal Service. Until recent years he always shaved with a straight razor, a remarkable accomplishment in the eyes of most of us and now a dying art. Unlike his fellow Kansans and their neighbors from western Missouri who made a fetish of springing into action before sunup (remember Harry Truman's early morning walks around Washington?), H. K. was a late riser. He loved to read on almost any topic, but numbered among his favorites were herpetological, ornithological, and other natural history literature, biographies, which he especially liked, whodunits, and the delightful fantasies of J. R. R. Tolkien. Much of his research was undertaken during the evening hours, which were usually free from interruptions, and, that, in addition to his reading tended to make him something of a night owl. Despite his quiet friendliness, he was also a "loner" who enjoyed spending long hours by himself.

Howard Gloyd was married twice, first to Leonora K. Doll from 1925 to 1947 and by whom he had two children, Helen Katherine and Roger Scott, the latter named for me and his father. His second wife was Kathryn J. Stephenson, his widow; they were married almost 31 years. In his usual modest way he insisted on no funeral service, but he suggested that, instead of flowers or other ephemeral tributes, his friends and colleagues might wish to contribute to the Nature Conservancy General Fund, 1800 N. Kent Street, Arlington, Virginia 22209.

H. K. has left us, but I shall be working with him, in a sense, for a long time to come. His failing health made it obvious that he would not be able to complete his monograph on Agkistrodon and its related genera without help. So with his consent, I re-entered the project in late 1976, and will endeavor to finish the research we envisioned in the days of our youth. He has done an enormous amount of work on it, especially in searching the literature and compiling accounts of the many taxa. His careful studies on the Asian members of the group are quite thorough despite the language difficulties and the political "curtains" that made communication with Russian and Chinese herpetologists impossible for decades. His files and banks of data are in perfect order and a joy with which to work. I hope I can do justice to his second major opus - the rattlesnake monograph, of course, was the first.

Personally, my loss is great. There is no longer the warm presence, the kind and understanding friend who was ever ready with help and advice whenever I needed it. How many of us can boast of a close and valued professional companionship that lasted almost 50 years?

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T.R. Johnson

THE HERPETOLOGICAL COLLECTIONS OF THE STRECKER MUSEUM

Strecker Museum's beginnings date from the 1850's, although the collections were not officially designated as a museum until 1893 (Brown, 1976). Strecker Museum has a long history of involvement with research in herpetology; John K. Strecker, Curator of the Strecker Museum (then known as the Baylor University Museum) from 1903 until his death in early 1933, is considered to be the "Father of Texas Herpetology." He also furthered herpetology throughout the nation during his curatorship at the museum. Curators since Strecker have done much to continue the strength of Strecker Museum's herpetological collections. The current Director and Chief Curator of the Museum, Dr. Bryce C. Brown, has added considerably to these collections, especially through extensive field work in Mexico.

Since a recent report (The Committee on Resources in Herpetology, 1975) contains incomplete and inaccurate data on the herpetological holdings of the Strecker Museum, a current summary of the museum's collections seems necessary. Also, in a recent listing of museum acronyms (Electronic Data Processing Subcommittee, Herpetological Resources Committee, 1978), BAYUM was listed for Baylor University Museum, a name and acronym not in use since the 1940's. There was no listing for Strecker Museum (SM).

The SM collection contains approximately 45,000 fluid preserved and skeletal specimens, about equally divided between reptiles and amphibians. This includes the former Texas Christian University (TCU) herpetological collection which was donated to Strecker Museum in 1972. The TCU acronym was also not listed by the Electronic Data Processing Subcommittee.

Geographical emphases of the SM collection are United States (70%, with a strong emphasis on Texas) and Mexico (25%). Special collections include field notes, cleared and stained specimens of the troglodytic Eurycea species, and a series of live exhibits which includes approximately 50 specimens. Type specimens (holotypes and paratypes) total 57.

The SM collection data are currently being stored in the museum's new computer. When completed, this will allow a wide variety of indices (geographical, taxonomic, collector, etc.) to be obtained with ease.

LITERATURE CITED

Brown, Brent A. 1976. A history of the Strecker Museum, 1857-1968. Unpubl. MA Thesis. Baylor Univ.

Electronic Data Processing Subcommittee, Herpetological Resources

Committee. 1978. Museum Acronyms. Herp. Review 9(1): 5-9.

The Committee on Resources in Herpetology. 1975. Collections of preserved amphibians and reptiles in the United States. Herp. Circ. #3, Soc. Study Amphibians and Reptiles. Pp. 1-22.

DAVID M. HILLIS, Curator of Herpetology and DAVID O. LINTZ, Technical Staff Assistant, Strecker Museum, Baylor University, Waco, Texas 76703.

Australian Society of Herpetologists

1978 Annual Meeting
Martindale Hall, South Australia
26-29 August 1978

TITLES

Cytosystematics of Australian skinks: a preliminary report. Les Gross and W. P. Hall, Department of Genetics, University of Melbourne, Parkville.

Gas conductance through dinosaur eggshells. Roger S. Seymour. Department of Zoology. University of Adelaide, Australia.

Investigations of anuran subcutaneous sacs. David B. Carter, Department of Zoology, University of Adelaide, Australia.

Cutaneous receptors in the skin of the lizard, Amphibolurus barbatus. S. G. Maclean, School of Anatomy, University of New South Wales, Australia.

The occurrence of a new species of tree frog belonging to the Litoria ewingi complex in New South Wales. A. W. White and R. Whitford.

The tongue musculature of Australian frogs. P. Horton, Department of Agronomy, Waite Agricultural Research Institute, Glen Osmond, South Australia.

Orientation of crocodile nests to watercourses. William E. Magnusson.

On the adaptive ecology of three species of gecko genus (Rhoptropus) of the central Namib Desert. F. J. Odendaal.

The effect of hypercapnic and hypoxic atmospheres on ventilation in the sand goanna, Varanus gouldii rosenbergi (Squamata: Varanidae). David Papps.

The ovarian follicle and corpus luteum in the Australian skink Egernia cunninghami. G. S. Kesby, School of Anatomy, University of New South Wales, Kensington, New South Wales.

Stomach flushing: a new technique for studies of reptilian and amphibian dietary habits. John M. Legler, Lisa J. Sullivan, and Rich Shine.

Sexual size dimorphism in reptiles and amphibians. Richard Shine, Department of Zoology, University of Sydney.

Conservation, public education, and herpetological societies. Julian White.

Further analysis of the hybrid zone between Geocrinia laevis and G. victoriana in southwestern Victoria. D. F. Gartside, M. J. Littlejohn and G. F. Watson, University of Melbourne, Parkville, Victoria, Australia.

The entry of the Oriental herpetofauna into the Australian region. Michael J. Tyler.

Dispersal and population structure in the sleepy lizard, Trachydosaurus rugosus. R. Satrawaha, School of Biological Sciences, The Flinders University of South Australia.

Interspecific acoustic interaction within the Litoria ewingi complex. Peter A. Harrison, Department of Zoology, University of Melbourne.

The functional significance of the two components in the complex breeding call of Geocrinia victoriana. M. J. Littlejohn and P. A. Harrison, Department of Zoology, University of Melbourne.

Call structures and taxonomy of southern Australian Neobatrachus (Anura: Leptodactylidae). J. D. Roberts, Zoology Department, University of Western Australia, Nedlands, Western Australia.

The Fourth All-Union Herpetological Conference of the USSR

The Fourth Herpetological Conference was held at the Zoological Institute of the USSR Academy of Sciences in Leningrad on February 1-8, 1977. Two hundred thirty-six scientific workers from scientific research institutes of the USSR Academy of Sciences, Academies of the Union Republics, Ministry of Health, Ministry of Agriculture and from universities and higher schools of the USSR took part in the Conference. The participants received a greeting telegram from the American Society of Ichthyologists and Herpetologists and from a number of foreign colleagues.

The Conference discussed a wide range of problems concerned with systematics, ecology, ecological physiology, geographic distribution, faunal history and economic importance of Amphibia and reptiles in the native fauna. The conference reviewed the results of herpetological development in the USSR since the Third Conference (1973) and outlined the vital aims and ways for further development. Proceedings of the conference were published in a book of collected abstracts titled The Problems of Herpetology (Leningrad 1977).

The main plenary report "Herpetology in the Soviet Union in 1973-1976" was delivered by I. S. Darevsky, the chairman of the All-Union Herpetological Committee. The speaker emphasized that during the recent year, about 260 different herpetological articles were published in the USSR, which is an increase of one fourth over the number of works published during the four-year interim between the second Conference and the third. During this period, 25 herpetological theses were defended, not to mention some special toxicological theses. Considerable success was achieved in faunology. New species of lizards and snakes were discovered in the USSR fauna. Many new faunistic findings considerably widen the previously-known ranges of several species. Identity of several reptile species was proved by karyological and biochemical analyses. The study of systematics and taxonomy, comparative morphology, anatomy and karyology of Amphibia and reptiles was successful. Research on hybrid and intergrading populations was carried out. A comprehensive contemporary research project was carried out on the ecology of numerous landscape species (i.e., the most typical and common indigenous species), and on those of venomous snakes whose venoms are used in pharmacology. Ecto- and endoparasites of Amphibia and reptiles were studied. Some rare and endangered species were revealed and inserted into the "Red Data Book" of the USSR.

The contribution of Soviet paleoherpetologists is great. In addition to ancient groups, they also study more recent though extinct forms.

Among the numerous publications, one should especially note the collective monograph "The Sand Lizard (Lacerta agilis)" published in 1976. In the nearest future, monographic descriptions of some other widely distributed species of the USSR fauna and neighboring countries will be published in the same series. Work on compiling the "Catalogue of Amphibia and Reptiles" of the USSR will also be started.

The first plenary session dealt with the principles of reptile phylogenetic classification. L. P. Tatarinov (Moscow) widely discussed the extent and limits of Class Reptilia. In particular, he paid attention to the necessity of distinct definition of the initial stage of reptile evolution from the moment when such a class appeared. The speaker expressed an important idea that this stage and the beginning of higher vertebrate divergence should be referred to the phylogenetic level preceding the appearance of Seymouriamorpha. It was mentioned that transferance of several transitional forms and groups from one class to another or treating them as

independent classes, as suggested by taxonomists, does not solve the problems of phylogenetic classification.

L. I. Khozatsky (Leningrad) read a report on construction of a reptile system. Working out a phylogenetic classification of any group of organisms should be in itself a synthesis of objective data on lines (directions) of evolutionary development of interrelated groups and about taxonomic extent and rank of each of them. Any taxonomist should base his suppositions on the unity of interrelated characters of the studied organisms--morphological, physiological and ecological. With due regard for these general ideas a scheme of the main taxonomic subdivisions of Amniota is given, which should be distinctly divided into two superclasses: Therapsida and Saurapsida. The first should include: Theriamorpha and mammals and (supposedly) a class of Euryapsida (Ichthyopterygia and Synaptosauria). It was suggested to separate the superclass Sauropsida into the following classes: Anapsida (diadectomorphous Cotylosauria and turtles), Dinosauria, Pterosauria and true reptiles (Lepisauria, Thecodontia and Crocodilia) and birds.

M. N. Iordansky (Moscow) considered the problem of the origin of snakes. After detailed osteo- and mycological research on jaw apparatus in lizards and snakes, he arrived at the conclusion that snakes were most closely related to geckos (not to monitors as commonly accepted) and appeared probably from an ancestral stem "protogecko." The paper of N. N. Shcherbak and M. L. Golubev (Kiev) contained results of taxonomic analysis of several genera and subgenera of geckos of the Gekkonidae fauna of the USSR. L. L. Borkin (Leningrad) and A. L. Mazin (Moscow) investigated interdependence between the quantity of nuclear DNA and systematic rank and ecology of Amphibia on different taxonomic levels from that of the Class to the geographic population, on the basis of their own results (most Amphibia species in the USSR) and of published data. They have confirmed positive correlation between the quantity of DNA and minimal developmental rate and shown intraspecific geographic variability of genome size. A. T. Toktosunov and E. Y. Masik (Frunze) have studied different populations of the toad Bufo viridis from karyological aspects in Kirghizia. While lowland populations are diploid, the typical forms of toads, Tien Shan high mountain green toads were tetraploid which was the reason for their adaptability to unfavorable parameters of the environment. N. I. Solomatina (Moscow) has examined pecularities of reptile skull and biomechanisms of their jaw apparatus.

I. A. Antipchuk (Melitopol) carried out comparative-morphological research on the lungs of crocodiles and birds and has established homology of respiratory organs of these groups. By means of the electron microscope, N. B. Ananieva and N. E. Mikkau (Leningrad) have studied skin receptors of different lizard species. Having studied ontogenetic rebuilding of the sublingual apparatus in Amphibia, A. S. Severtsov (Moscow) has revealed the historical changes of morphogenetic processes in the course of metamorphosis.

The problems of ecological physiology and behavior of Amphibia and reptiles were reflected in the paper by E. D. Vassiliev and S. V. Smirnov (Moscow) on the ear and hearing of lizards, snakes and turtles. V. E. Sokolov and V. P. Sukhov (Moscow) applied radiotelemetric methods and have studied daily changes of movement activation and body temperature of the tortoise Agrionemys horsfieldi. Other papers and reports contained interesting information on physiology and behavior and on morphology of Amphibia and reptiles.

Particular attention being paid to the problems of ecology, a special session dealt with them. Papers of the following authors should be mentioned: V. I. Garanin (Kazan) about the role of Amphibia and reptiles in biocoenoses of anthropogenic landscape (i.e., habitats changed as a result of intensive human activity), V. G. Ishchenko (Sverdlovsk) about productivity of populations of tailless Amphibia, L. G. Apostolov and co-workers (Dnieperpetrovsk) about energetics of trophic relations of these Amphibia.

A comprehensive investigation of peculiarities of Amphibia and reptiles existing in natural surroundings and under conditions of anthropogenic landscape was performed and the number of representatives of several species was calculated. On the basis of these results, principles and concrete recommendations on protective measures for these animals are being worked out. The Conference has adopted a list of rare and endangered species of Amphibia and reptiles to be included into the "Red Data Book" of the USSR as reported by A. G. Bannikov (Moscow). Great importance was attached to the problems of toxicology. Review of the papers on this topic will be published in "Toxicon," the journal of the International Toxicological Society.

At the final plenary session, the participants of the Conference listened to an interesting report including a showing of many slides by N. N. Drosdov (Moscow) about the herpetofauna of desert regions in Australia. At the same session, interesting reports were read by foreign herpetologists--G. Dobrovolska (Warsaw), L. Berger (Poznan), G. Deli (Budapest), G. Peters (Berlin).

The concluding item of the Conference was adoption of a detailed resolution which reflected the most important achievements of Soviet herpetology and outlined ways of its further development. Professor I. S. Darevsky, the head of the Laboratory of Ornithology and Herpetology (Zoological Institute of the USSR Academy of Sciences), was again elected chairman of the Herpetological Committee.

I. S. DAREVSKY and N. N. SCHERBAK, Zoological Institute, Academy of Sciences of the USSR (Leningrad) and Institute of Zoology, Academyof Sciences of the Ukrainian SSR (Kiev).

Rebuttal to Smith and Kohler on Introduced Species

In a recent edition of the Transactions of the Kansas Academy of Science (Vol. 80, nos. 1-2, pp. 1-24), H. M. Smith and A. J. Kohler published "A survey of herpetological introductions in the United States and Canada". As is Dr. Smith's usual style, it is a very thorough and well-researched study of the subject. The body of the paper, however, proposes several alarming or, at the least, debatable points of philosophy that I feel should not go unargued.

The main points that I disagree with are as follows:

1) I find a central theme throughout the paper that introduction of non-native forms is or can be beneficial, if populations of same are thoroughly monitored and researched prior to their introduction. This may be weakly plausible; however, there is an inherent assumption here that only competent researchers will be responsible for such introductions. Unfortunately, there is a long and well-documented history of most of the introductions into the United States being done by those with little or no competence in any biological field (i.e., pet dealers, their customers, etc.). This has been and most likely will continue to be the major source of exotic animal pollution in this country, and shows all the more need for stricter regulation in this area.

2) I strongly disagree with the concept that introductions "should be encouraged when preliminary, thorough, broadly perceptive appraisals suggests a high probability of success and a minimum risk to existent diversity" (emphasis mine). I contend that the state of the art today precludes the possibility of such thorough, broadly perceptive appraisal. We are just beginning to

understand the basic biology of only a tiny percentage of native species, much less exotics. For example, how well known are the exact niche requirements for such forms as Diadophis punctatus, Plethodon glutinosus, or the Rana pipiens complex? I dare say many of us could say where and when these forms could be found, but how many, if any, could say exactly why? To propose the introduction of even more poorly known exotics at this time seems to me irresponsible.

Smith and Kohler did not touch upon risks to future diversity. Is it not logical to assume that if an introduced species has successfully occupied a particular niche that this precludes the availability of that niche to any future populations of native forms into which to adapt? As the authors themselves put it, "The unoccupied niches that exist... are...very crudely understood."

3) I disagree also with the idea that dilution of the genome is the most deplorable aspect of introductions. While certainly it is an important consideration, the possible reduction or extinction of native species has to be an even more important consideration. Smith and Kohler themselves remark that "native diversity is a precious heritage any diminution of which diminishes ourselves."

The authors have also passed over rather lightly the negative aspects of certain introduced species, such as Bufo marinus and Xenopus laevis. B. marinus is considered a hazard and pest throughout much of its range, competing with and/or consuming many individuals of native anurans, small mammals, and the like. Its ability to poison humans is well known. The depredations of Xenopus larvae on native amphibian larvae in the southwestern United States have been shown to be extensive and, in certain cases, quite complete. The deadly properties of Dendrobates toxins are also well known and the establishment of such an attractive animal in Hawaii must surely be treated with some alarm.

My final objection is this: Smith and Kohler are proposing, if you will, a form of "ecosystem engineering" with all the inherent risks that have been shown with genetic engineering, and perhaps with even greater, more subtle dangers than are present there. Genetic engineers deal in a level of precision that organismal and evolutionary biologists can only dream about, and yet much of their work is a matter of hit-and-miss or hope-for-the-best. We have a moral obligation, at this point in time, and considering the current state of environmental affairs, to protect at all costs what little we have left of our natural heritage. To tamper with that heritage via introductions of non-native animals into the United States seems to me, again, irresponsible.

ERIC M. RUNDQUIST, 1612 Tennessee, Lawrence, Kansas 66044. ●

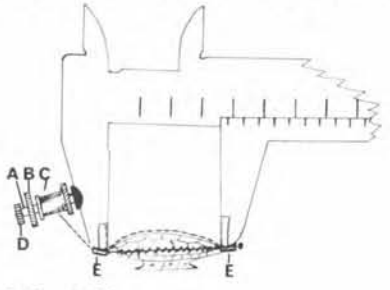
A Modification of Vernier Calipers for Measurement of Convex Curved Surfaces

Accurate measurement over a curved surface is at best difficult. Most systems employed are beset with problems of convenience and accuracy. The use of a string or wire stretched over the curve and then compared to a linear scale is inaccurate and difficult on small specimens. The modified vernier calipers described below overcome both problems. The calipers have been fitted with a flexible filament which conforms to a convex curve and is then stretched tight by sliding the jaws of the calipers apart. The distance along the curve is read as a linear measurement on the standard scale of the calipers. Specific application has been to the measurement of curved length and curved width of embryonic marine turtles. This application has provided two measurements in one operation: straight distance and distance along the curve of the carapace.

Modification

Figure 1 provides a detailed view of the modifications necessary to adapt standard vernier calipers for the measurement of convex curves.

The central pin (A) is a threaded piece which has been silver soldered to the calipers. The pin was fitted with a free moving, flanged spool (C), a threaded locking nut (B), and a retaining cap (D). The spool was fashioned to have a larger bottom flange which allows the spool to be turned and a small top flange which retains the filament. The locking nut moves on the threads of the central pin and can be secured against the spool. The bottom flange of the spool and the locking nut were knurled to provide a non-slip surface for easy movement. The retaining cap was spot welded to the central pin. Two stainless steel guide tubes (E) were silver soldered to the tips of the outside diameter prongs of the calipers.



A Threaded Pin
B Locking Nut
C Spool
D Cap
E Filament Guide

Fig 1 Diagram of vernier calipers modified for measurement of convex curves.

The filament was attached to the spool by a knot anchored in a small hole drilled through the top flange. The filament could have been tied around the spool. Approximately 15 centimeters of filament were wrapped on the spool. The filament was then passed through the guide tubes and knotted so that the knot was anchored against the second guide tube.

Application

The calipers may be used in the normal manner by either placing the object to be measured within the jaws from the side or by using the inside diameter prongs as determined by the shape of the object to prevent the diameter of the filament from interfering with accurate measurement. The caliper slide lock screw may be tightened to prevent slippage. The outside diameter prongs are then applied to the subject while the filament is allowed to unwind from the spool. When a snug contour is achieved, the locking nut is tightened against the spool. The straight line distance is recorded before the calipers are spread to measure the distance along the curve. Once practiced, the process can be accomplished without awkward handling of either the specimen or the calipers.

The modified calipers can also be used to measure the circumference of small round objects as well as the contours of convex curves. Circumference has been measured on the eggs of marine turtles.

Accuracy

The accuracy of the basic calipers is not altered by this modification. However, three factors which affect the accuracy of measurement along the curve are evident: the elasticity of the filament, the distance over which this stretch operates and the tension applied. The selection of a filament is incomplete. Monofilament fishing line, multi-strand twisted nylon thread, dental floss and surgical suture have been tried. Braided silk surgical suture (2.5 metric or 2/0 B.P.C.) have proved to stretch the least: 0.01 cm at 6.60 cm distance during 100 tests. The placement of the spool assembly and anchor close to the tips of the prongs helps to reduce the stretch-error in the measurement.

The tension of the filament over

the contour of the curve remains the greatest source of error. With practice, an operator can maintain the same tension over the curve and during linear measurement.

Repeated measurements of inanimate and animate objects have produced a consistent error or less than 0.5%.

Summary

The modified vernier calipers allow measurement of convex curves with convenience and accuracy.

Acknowledgements

I should like to thank Mr. M. Road of the University of New England who built the prototype from a crude drawing. I also wish to thank Mr. C. J. Limpus of Queensland National Parks and Wildlife Service and Dr. R. Winokur of the University of New England for reading the manuscript.

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A Simple Trap for Basking Turtles

Specimen capture has always been a major problem when studying turtles. The following is a description of a basking trap that has been used successfully to capture Graptemys geographica.

Several basking trap designs using ramps or treadles have been used by various authors (Cagle, 1950; Ream and Ream, 1966; Clark and Gibbons, 1969). These designs are complex, expensive to purchase or time-consuming to construct and are not easily transportable. All are designed to prevent captured turtles from escaping. Sexton (1959) used a floating square frame of 2" x 4" basking boards surrounding a chicken wire net into which the turtles fell after basking. The probability of any one turtle being captured is only 50%.

The new design is inexpensive and easy to construct. It consists of a floating square frame of 1" x 1" or 1" x 2" boards supporting a net (Fig. 1). This design used small mesh nylon netting of the type used to protect crops from birds. The net is stapled to the frame and submerged by a few small stones. A floating basking board made from a length of 2" x 10" lumber is attached to the frame by wire passed through fence staples. The whole assembly is held in position by anchors at both ends.

The trap is placed in a favourable location. Turtles climb out on the basking board, usually from the ends. Upon arrival of the collector, the turtles drop into the net and are easily removed by boat or by wading. One advantage of the design is that the traps do not have to be tended regularly; turtles can easily surface and escape by climbing over the frame. Because of the un-trap-like nature of the design, turtles readily use the traps as basking sites. The traps can be easily moved to accommodate changing water levels or movements in turtle populations.

Another advantage is that these traps can be constructed from almost any scrap or leftover material. Any available type of lumber or netting would be suitable. Bricks or scrap metal can be used as anchors. Traps can be easily transported by automobile or boat in a partially assembled state.

These traps have been used with great success in an ongoing study of Graptemys geographica. One trap on one occasion caught eleven individuals. All size classes of map turtles have been caught and there is no apparent bias in the sex ratio of trapped turtles. The traps used measure approximately 90 cm on a side; for larger species, greater dimensions may be desirable.

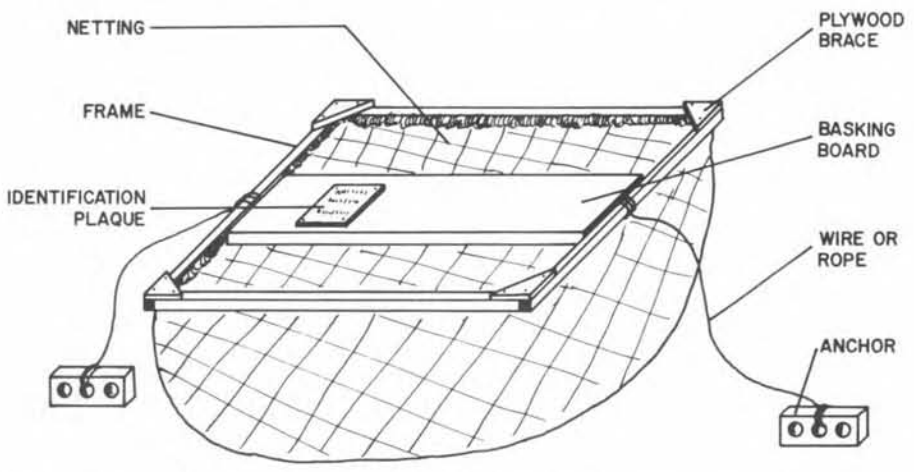


Figure 1. Diagram of the new design of turtle trap.

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SSAR Business

Minutes -- Business Meeting 2 June 1978

The SSAR General Business meeting was convened by Joseph T. Collins, Chairman; those assembled did not constitute a quorum of the Society. Collins reviewed the actions taken by the Board at their meeting on Wednesday, May 31:

It was decided that, due to a backlog of species accounts, the Society would publish 25 species accounts for the Catalogue of American Amphibians and Reptiles during 1979. There will be no additional cost to subscribers. Also, on an experimental basis, the address of the senior author will be included in citations published in the Current Literature section of Herp. Review.

It was reported that the Committee on Translations had a number of papers available. A list of available papers will be advertised in a future issue of Herp. Review. This is a new program that can provide a valuable service. All members are urged to take advantage of this service.

Collins reported that the Committee on Scientific and Common Names had completed its task and that the Committee's report would be published as Herpetological Circular No. 7 during the forthcoming year. It will be distributed gratis to all members.

The Legislative Alert Committee has developed an extensive network

for collecting information about pending legislation and/or regulations that affect our community at both the national and state levels. The network is designed to provide rapid responses from qualified professionals on federal and state issues that affect herpetology. The Committee has provided numerous comments on proposed listings of herps.

Collins presented the recommended slate of candidates for the elective offices of the Society for 1979: Chairperson--James E. Huheey and Robert G. Webb; Secretary--Stephen R. Edwards; Treasurer--Henri C. Seibert; Directors (two to be selected for the Class of 1981)--Roger Conant, Sheldon Guttman, Robert Jaeger, Edward Moll, and Samuel S. Sweet. Kirkland Jones moved (and it was seconded) to accept the slate of candidates as presented by the Nominating Committee. All present voted unanimous support for the slate of candidates.

Collins announced that the second annual Regional Herpetological Society Conference had been scheduled during the Tempe meetings. Preparations had been under the direction of Tom Johnson. Based on preregistration, it appeared that this conference would be as successful as the first.

Collins announced that the Board has approved, in principle, a Grants-In-Herpetology program that would be initiated in January 1979. Further, any awards made under this program would be announced at the Knoxville meeting. It was reported that over the past few years considerable funds had accumulated in the Conservation Fund ostensibly to be used for the purchase of land to insure the survival of endangered species. To date, this fund had been used only once; a contribution to the Organization of Tropical States to purchase land in Costa Rica. Those in attendance were asked if it would not be appropriate to use these funds to support the Grants-In-Herpetology program. In response, following considerable discussion, Craig Nelson moved (John Brody seconded) to use those funds for continuing the conservation grant aspect of the Grants-In-Herpetology program. All present voted in the affirmative except one.

In subsequent discussion concerning the impact of such votes on the Board, Craig Nelson moved (Ralph Axtell seconded) to recommend that the Board consider modifying the bylaws of the Society so that those present, and voting at an announced business meeting, at the annual meeting of the Society, would constitute a quorum. Of those present, only two responded in the negative.

It was announced that the budget for 1979 was set at $48,000.

Pursuant to Article IX of the bylaws, Collins read a proposed amendment to the bylaws that would change the title "Chairman" to "President" in the bylaws. Eldon Romnie moved (Jim Knight seconded) to accept the recommendation and to submit the proposed amendment to the members on the election ballot that would be circulated following the meeting.

Collins adjourned the meeting thanking all those that participated for their interest and support.

Respectfully submitted,

Stephen R. Edwards
Secretary ●

1979 SSAR Standing Committees

Annual Meeting Site

Robert W. Henderson C
Ronald J. Crombie
Carl S. Lieb

Common and Scientific Names

Joseph T. Collins C
James E. Huheey
James L. Knight
Hobart M. Smith

Grants-in-Herpetology

Harry W. Greene C
John Behler
C. Kenneth Dodd, Jr.
Stephen R. Edwards
Martin J. Rosenberg

Legislative Alert

Hugh Quinn C
T. J. Berger
Robert Mount
Norman Scott
M. L. Skaroff

Nominating

Max A. Nickerson C
Jerry D. Johnson
Tom R. Johnson
Alan H. Savitzky
Terry D. Schwaner

Regional Society Liaison

Tom R. Johnson C
Richard D. Bartlett
Grace Harris
John Murphy
John J. Zura

Student Award

Michael V. Plummer C
John B. Iverson
John D. Lynch

Translations

Robert Aldridge C

Zoo Liaison

James B. Murphy C
James Bacon
John Behler
John D. Groves
Joseph Laszlo
Frank Slavens

C = Chairperson of the committee ●

Report of the SSAR Committee on Common and Scientific Names for 1978

This report is the first of annual up-dates to be prepared by the SSAR Committee on Common and Scientific Names for North American Amphibians and Reptiles (north of Mexico). This report (and future reports) is compiled to fulfill the charge to our committee to keep the herpetological community informed of published taxonomic shifts and new descriptions, and to propose new common names brought about by same. In addition, this first report will permit us to point out typographical errors, inadvertant omissions, and a few outright errors that appeared in "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" (1978).

The proposed changes and corrections listed below are in order as they appear in our Common and Scientific Names list.

PAGE 3, table 1: For Frogs and Toads, 80 species should read 81, and the species total should read 455, not 454.

PAGE 8, line 14: P. n. hubrichti should be called "Peaks of Otter Salamander," not "Thunder Ridge Salamander." P. n. hubrichti is not found on Thunder Ridge (Richard Highton, pers. comm.).

PAGE 13, line 3: malanota should read melanota.

PAGE 13, line 18: Rhinophrynus dorsalis should be "Mexican Burrowing Toad," not "Mexican Burrowing Frog."

PAGE 16, line 7-8: Iverson (1978) has proposed that the subspecies of Kinosternon bauri not be recognized.

PAGE 29, line 35: Lampropeltis triangulum celaenops should be "New Mexico Milk Snake," not "Mexico Milk Snake."

PAGE 30, line 2: Williams (1978) has proposed that Lampropeltis triangulum temporalis not be recognized as a valid race.

PAGE 30, line 35: lineatus should read lineatulus.

PAGE 35, line 30: rufipunctata should read rufipunctatus.

PAGE 36, line 1: Webb (1966) proposed Thamnophis sirtalis dorsalis as a replacement for T. s. ornata. The latter should be deleted from the list. The common name remains unchanged.

PAGE 36, line 5: semifasciata should read semifasciatus.

Those individuals wishing to keep their lists current should so note the above changes. We are indebted to George R. Pisani, Richard Highton, and Douglas A. Rossman for bringing some of these changes to our attention.

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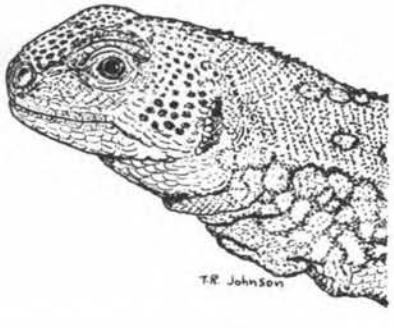
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JOSEPH T. COLLINS, JAMES E. HUHEEY, JAMES L. KNIGHT and HOBART M. SMITH, SSAR Committee on Common and Scientific Names.



SSAR Election Results

PRESIDENT-ELECT:	Robert G. Webb
SECRETARY:	Stephen R. Edwards
TREASURER:	Henri C. Seibert
DIRECTOR:	Roger Conant
	Edward Moll

Book Reviews

Mexican Herpetological Literature, Automation, and the Future

SYNOPSIS OF THE HERPETOFAUNA OF MEXICO. Volume IV. Source Analysis and Index to Mexican Amphibians. Hobart M. Smith and Rozella B. Smith. 1976. John Johnson, R.D. 2, North Bennington, Vermont 05257. 1976. 260 pp., cloth bound, $12.50.

A completely cross-referenced index to the literature on the herpetofauna of Mexico through 1973! Yes, it has been finished. The publication of volume 4 of the "Synopsis of the Herpetofauna of Mexico" provides biologists with a literature search system that is unparalleled in our field. Volumes I and II contain the literature references, and volumes III and IV comprise indices to the literature on reptiles and amphibians respectively. These four volumes are the results of a unique combination of resources--Hobart Smith's unequalled knowledge of the literature on the Mexican herpetofauna and Rozella Smith's uncanny abilities with electronic data retrieval systems.

Following a general introduction, the volume is conveniently divided into three major sections corresponding to the taxonomic groups of amphibians--frogs, salamanders, and caecilians. Each section contains an introduction, primary index, synonym list, species combination list, subspecies combination list, state list, and valid name list. At first glance, the pages seem to be filled with an incomprehensible jumble of names and numbers, but upon reading the simple instructions in the introduction it is possible to obtain readily all of the literature references (contained in volumes II and III) to a given species no matter what name combination or synonym was used in the references. By a somewhat more laborious task, one can obtain the literature references pertaining to a given state in Mexico. The only more rapid access to the literature would be to have a remote terminal access to Smith's computer file.

For those of us who have spent hours pawing through the Zoological Record and recent issues of journals and museum publications in the agonizing effort of obtaining a bibliography on a given genus or species, the first four volumes of the "synopsis" are analogous to a pair of crutches to a double amputee. The prodigious task of indexing can only be inferred from the number of bibliographic items (1457 for frogs, 961 for salamanders, and 151 for caecilians) giving 15,817 index entries. (The numbers for reptiles in volume III are much higher.)

The computerization of the bibliography and index has permitted the acquisition of certain kinds of data not otherwise available. Thus, as in the preceding volumes, the authors have provided chronologies of authors and taxa and various other kinds of data, such as citation frequencies. Although these data included in the introduction to each major group are superfluous to the index, they do provide some interesting insights into the literature on Mexican herpetology. As examples, 61 authors are responsible for naming the 202 taxa of Mexican anurans; Taylor named 35, Cope 15, and Boulenger only 8. I was amazed to find that the greatest number of works per author on Mexican anurans is 52 and that that number is shared by Hobard M. Smith, Edward H. Taylor and me!

The promulgation of electronic data processing systems and the availability of diverse kinds of "software" provide biologists and bibliographers with powerful tools to store, index, analyze, and retrieve information. The Smith's endeavors, although modern to the thinking of most of us, are only a first step in the forthcoming automation revolution.

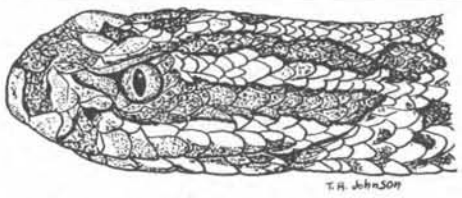
Although most biologists are aware of the benefits of computerization of research data, perusal of most any journal, especially Systematic Zoology and Ecology, reveals a variety of results ranging from numerical techniques in systematics to ecological modeling. But two fields are only on the threshold of automation--data management (with its attendant literature) and publication. Retrieval of electronically processed data based on literature, specimens, characters, etc. has a variety of applications. Hall (1971) and Morse, Peters, and Hammel (1971) demonstrated computer-generated keys to the identification of taxa. Sala and Simmons (1977) have proposed a computerized universal taxonomic checklist. Electronic data processing of museum collections is in process in several museums. A variety of systems are available that permit rapid retrieval of data in diverse categories; see Neuner (1976) for details of one widely used system. It is now possible to have computer-generated distribution maps, and by using overlays from satellite imagery, one can determine relationships between distribution patterns and various environmental factors, such as soil moisture, vegetation type, and vegetation cover.

Computer-based technological advances are revolutionizing the printing industry; soon, conventional linotype machines will be historical artifacts. Manuscripts can be

composed on a remote terminal, stored in a computer, edited, and output into a photo composition system--all much faster and less expensive than conventional techniques. Editorial processing centers will eliminate much of the time-consuming editorial chores, while still preserving the integrity of individual journals (Rhodes and Bamford, 1976). But in the near future, publication as we know it today probably will be a thing of the past for the most part. Journals will consist of abstracts (with key words noted for bibliographic indexing). The text of the paper will be on file in a data bank; it will be available to interested researchers upon request, perhaps through a remote terminal in your office. Or, a whole series of papers or even a complete "issue" of a journal will be available on videotape and the illustrations in the form of stereomicrographs (Capital Systems, 1966). In the foreseeable future in scientists' offices, computer terminals will be as common as (and more frequently used than) telephones are today.

So, what might 1984 be like for the biologist interested in Mexican herpetology. Let us review the procedure a few years hence. Dr. Future is a curator of a large herpetological collection. He has received a collection of amphibians from a colleague in Mexico. Sitting at his remote terminal, he calls up the Mexican frog key in the computer. Series of questions flash on the screen and he quickly checks the characters on his specimens until he has passed through the key and received identifications of his species one by one, save for one identified only to genus--its combination of characters differing from all others stored in the file. The need for investigation is obvious. A check of the extensive holdings of the genus in the collection reveals that all known species are well-represented and none has the characters of the newly acquired specimens. A literature search of an updated index to the literature on the Mexican herpetofauna is printed out by the terminal while Dr. Future is enjoying lunch. A perusal of pertinent literature reveals no records of such frogs.

The search cannot end there. Again residing at his terminal he calls up the data banks of all major museums in the country and within a few minutes has a list of all specimens, their catalogue numbers and localities. None is from the area from whence his new specimens came. Standard measurements are taken by means of electronic measuring devices and optical scanning and input directly into the computer, which upon demand produces standard statistics and graphs. Optical scanning produces a computerized image. Geo-



graphic coordinates, together with conventional catalogue data are entered into the system. The coordinates, as well as those of localities for the specimens from all of the museums are entered into a mapping program, which produces an up-to-date map of the distributions of the species in the genus.

The second day is devoted to "writing" on the terminal; a text editing program allows for rapid "rewriting." The final touches include the insertion of the "figures" and having the computer add the literature cited. Satisfied that the "manuscript" is ready for the editor, he has it put into the computer. The editor receives a call to retrieve the manuscript. Minutes later he is perusing it and decides upon two appropriate reviewers, whom he instructs by phone to call up the manuscript on their terminals. Using text editing systems, each reviewer makes changes and corrections; these are retrieved by the editor, who reviews the changes and calls the author. Dr. Future incorporates the changes and "sends" the manuscript back to the editor, who upon checking the abstract and key words puts the manuscript onto the magnetic tape containing all manuscripts for next month's issue.

Upon processing all manuscripts for the forthcoming issue, the editor informs the printer that he may retrieve the manuscripts for the next issue from the computer. Photocomposition of the titles and abstracts is completed rapidly; all titles and key words are entered into the bibliographic bank, and all manuscripts are coded and stored in the manuscript bank. In a few days all subscribers to the journal are reading the abstract of a paper describing a new species of frog received by Dr. Future only two months before. The few people who are really interested in these frogs obtain copies of the entire paper--output by their remote terminals. Impossible? Unlikely? Wait and see.

Are there pitfalls to overcome? Yes, but these are primarily the same ones that we face today and most, if not all, result from human error. Although the Smiths have cross-indexed all name combinations, they cannot substantiate the correctness of the identifications given in the references. A curator's specimens might be a well-known Asian frog bearing incorrect locality data. After all, it was only a few years ago that a new genus of hylid frog was named from South America only to be pointed out subsequently that the name was based on a specimen of a common African species! Whether we produce manuscripts with a crow-quill pen or with a computer, we will make mistakes, for we humans are fallible.

Probably the "synopsis" contains many errors--some by the authors and many more emanating from the references themselves. Nonetheless, the four bibliographic volumes of Mexican herpetology set a standard and a precedent; moreover they provide us with a giant step towards the future. It behooves members of the herpetological community to extend their gratitude to Hobart and Rozella Smith for their dedication, perserverance, and leadership.

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VENOMS: CHEMISTRY AND MOLECULAR BIOLOGY, by A. T. Tu. J. Wiley & Sons, N. Y. x + 559 pp. ill. $34.50.

SNAKES AND SNAKEBITE: VENOMOUS SNAKES AND MANAGEMENT OF SNAKEBITE IN SOUTHERN AFRICA, by J. Visser and D. S. Chapman. Purness, Johannesburg. 1978. 152 pp., ill. (obtainable from Purnell Book Services, P. O. Box 10021, Johannesburg 2000, S. Africa. $11.50 + .50 postage).

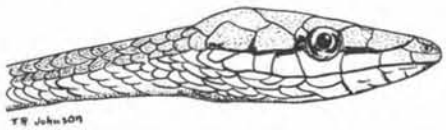
Although all three books deal with venom from snakes, they differ

in many respects in their approach to the subject. This brief review is from the point of view of a herpetologist and not that of a clinician or molecular biologist. Obviously, the Visser and Chapman book is limited geographically yet it provides more information of herpetological interest such as the structure of fangs, of venom glands, the biting behaviors of snakes, etc. Each South African species of poisonous snake is illustrated by a color plate. The clinical symptoms of snakebite are clearly described and correct and incorrect treatments critically compared. Range maps, bibliography and glossary are included.

Brown's book is worldwide in scope and concentrates more on the comparative toxicity of venoms. There are chapters on pharmacology, symptomatology and treatment, mortality rates, and a long table listing all the known poisonous snakes (including subspecies) and their distribution. Unfortunately, of the many color plates, most are of poor quality (one even upside down!). But if you want an answer to the oft-raised question, which is (are) the most dangerous (poisonous) snake(s) in the world, this is by far the best place to find the information.

As the subtitle indicates, Tu's book analyses the chemical construction of venoms as currently known from all those studies and it also describes in detail the effects of envenomation on systems and tissues of the body, both clinical and experimental. This is by far the most technical of the three books and probably the least interesting to the general herpetologist, but it contains the most detailed and comprehensive information on venoms. If anyone harbors the idea that snake venoms are simple secretions, a cursory examination of this text will quickly dispel the notion. Venoms are unbelievably complex, and each species of snake apparently has its own unique combination of substances. The venoms of the Gila monster, of spiders and hymenopterans are also included in this text. The bibliography is exhaustive but the editing and proofreading of the text material has been rather casual. To those who may be concerned about what to do in case of envenomation, I recommend Visser and Chapman, which was written by a herpetologist and a surgeon and harmonizes the two fields to best advantage.

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FLORIDA FROG CALLS: A GUIDE TO COMMONLY HEARD FROGS AND TOADS. Produced by Richard A. Bradley, 1978. LP monaural record. Available from: Florida State Museum Collector's Shop, Univ. of Florida, Gainesville 32611. Price $4.00 + .50 postage -- 4% sales tax to Florida addresses.

This delightful album provides listeners with samples of the breeding calls of 20 species of Florida anurans, plus rain calls of several. The taxa presented represent the bulk of Florida's anurans, and certainly include all that would be "...commonly heard...." Individual calls and seasonal choruses are recorded with excellent fidelity, and background noise (where at all present) is at a bare minimum. Linda Becker's pleasant, well modulated voice provides nice narration, and all-in-all, the disc is a fine companion piece to Cornell University's Voices in the Night (soon to be re-issued). The record provides interesting listening, and would be a useful teaching tool (anuran isolating mechanisms) for herpetologists lacking access to recordings of varied anurans.

I could wish for a couple of more Rana clamitans notes (only one distinct call is used--room exists on the side for others), and Archie Carr's jacket text rambles too much. Nevertheless, as I said before, it's a fine album and I recommend it highly.

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THE HANDBOOK OF AMPHIBIANS AND REPTILES OF U.S.S.R. by A. Bannikov, I. Darevsky, V. Lsehenko, A. Rustamov and N. Seherback, 416 pp., illustrations, maps. Published by Government Printing, Moscow, 1977.

This book is suitable for scientific identification of all known specimens of the herpetofauna of U.S.S.R., including short notes about the biology of all species and a bibliography. For any species, the authors note synonyms, terra types and named subspecies, but the identification keys extend only to species level. All species are illustrated by drawings, including 32 colour plates. Ranges of species are shown on 135 maps. This handbook is a more detailed and scientific version of the earlier, popular handbook "Amphibians and Reptilians of U.S.S.R." by A. Bannikov, I. Darevsky, and A. Rustamove (Moscow, 1971, 304 pp.) and the more recent version of the old classic work "Handbook of Amphibians and Reptilians of U.S.S.R." by P. Terentev and S. Chernov (Moscow, 1949) that describes 178 species in the herpetofauna of U.S.S.R., and contains new Russian literature, especially in systematics and zoogeography. The maps show between 90-100% of known localities according to collections of the major Russian museums, and incorporate the previously unpublished field notes from over 45 noted Soviet herpetologists. Another academic handbook of herpetofauna of U.S.S.R. is not planned for publication in the near future. Therefore, this handbook may be useful for professional herpetologists, students, or amateurs for some years into the future as the best identification guide of the Soviet herpetofauna, as well as a source of information about herpetological ecology and literature. The colour plates by Knodakov are based on his earlier plates in "Handbook of Amphibians and Reptilians of U.S.S.R." (Moscow, 1971), but other illustrations and maps are new. This handbook includes modern research by I. Darevsky on caucasian rock lizards, by N. Scherback on Eremias and by other workers.

THE PARASITE WORMS OF REPTILIANS OF U.S.S.R. by V. P. Sharpilo. Published by the Academy of Sciences, Ukrainian SSR, Institute of Zoology, Kiev, U.S.S.R., 1976, 288 pp., illustrated.

This monograph is based on the author's helminthological research between 1958 and 1974. The author's personal collection of material plus that of other researchers including the parasitic worm collection of Professor K. Skrjabin is discussed. The worms were collected by V. Sharpilo from 3772 reptilians collected from over 180 localities of U.S.S.R. Also included are samples from 98 reptilians from Mongolia, Bulgaria and some materials from China and Korea. Contained are reptiles of 27 species from other collections and 93 species from the author's research - over 140 (sic) species. The total number of newly described parasite species in this work is over 60. This monograph is highly technical, and may be of interest for professionals only, especially for specialists in helminthology. It will also be useful for veterinarians, and specialists in reptilian diseases. Some information from this book may be useful for ecological studies of reptiles. This book is the first monograph in this field in U.S.S.R., and the bibliography, identification keys, and figures of parasites should be valuable in the study of reptile diseases. Over 200 species of parasites are described in this book including known information about their life cycles and biology. It incorporates new material published about parasites of reptilians in Kazachstan, Central Asia, the Far East part of U.S.S.R., and eastern Europe (Bulgaria, Hungary, East Germany, Czechoslovakia) thus providing a book of the highest

currency for European specialists too.

THE CATALOGUE OF AFRICAN DESERT LIZARDS by N. Scherback, Academy of Science of Ukrainian SSR, Institute of Zoology, Kiev. 1975.

This monograph is based on the literature and is related to an earlier work by Scherback, The Palearctic Desert Lizards. The catalogue contains diagnoses of African specimens, synonyms, range maps, names of collection localities, and a bibliography inclusive to 1 January 1974. The author adheres to Boulenger's taxonomy, and generally uses the conventional genera. It differs in such genera as Pseuderemias, Lampreremias, Mesalina, and Taeniereremias, together containing 32 species that belong to subfamily Eremiaidae. The African center of species evolution is considered independent from other centers.

This small paperbound book may be interesting to specialists in African herpetology, but a small circulation (500 copies) limits easy accessibility. Only major scientific libraries will have this book and may supply material from it for those desiring such.

This book is now out of print.

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Herpetological Husbandry

GROWTH OF THE COBRA NAJA NAJA (SERPENTES, ELAPIDAE)

Studies on growth of certain species of snakes have been reported (Carpenter, 1952; Fitch, 1960; Wharton, 1966, Dmi'el, 1967; and others), but information is scant on the growth of the cobra Naja naja. On 28 November 1973, one N. naja hybrid hatched at the Fort Worth Zoo. Another hatched on 29 November and three on 1 December 1973 (Campbell and Quinn, 1975). Their parents were intergrade N. n. naja X N. n. kaouthia. Weights to the nearest 0.1 g and total lengths to the nearest mm were periodically recorded on all snakes (Quinn and Jones, 1974). One cobra did not eat and died on 27 February 1974, but the others were weighed and measured until 10 May 1976. The snakes were kept at ambient temperatures between 24° and 30° C with occasional readings as high as 35° C during summer months. They were housed in well ventilated fiberglass enclosures 75 x 30 x 30 cm with glass fronts. All snakes refused food for the first month. In January 1974, two began eating young mice, one began eating snakes (Coluber constrictor), and in February the others also began eating snakes (Thamnophis sp.). All cobras began eating mice by March 1974. By June 1974, all snakes were eating mice each week. All snakes shed for the first time at age 9 days.

Other authors reported total lengths of hatchling Naja naja from 228-360 mm (Table 1); others were 295-337 mm ($\bar{x}$ = 308 ± 1.83 mm). Petzold (1968) reported the weights of hatchling N. n. atra from 13.8-16.0 g. ($\bar{x}$ = 15.3 ± .14 g). The weights of our snakes were 18.0-20.4 g ($\bar{x}$ = 19.24 ± .49 g). The maximum total length reported for this species is 7 feet (2,133.6 mm) (Smith, 1943); our longest individual measured 1,230 mm ($\bar{x}$ = 1052 ± 4.89 mm) at age 29 months.

Table 1. Total lengths of hatchling Naja naja

Length (mm) / Subspecies / Authority
240-360 / N.n. oxiana / Smith, 1943
254 / unknown/ Miller, 1970
270-295 ($\bar{x}$=285.5±.17) / N.n. atra / Petzold, 1968
228-286 / N.n. naja / Wall, 1922
340-360 / N.n. kaouthia / Schweizer, 1952
250-300 / N.n. naja / Deraniyagala, 1955

Specific growth rates ("G" or "g") were calculated by using the following equation:

$$G = 100g = 100 \frac{\log YT - \log Yt,}{T-t}$$

where YT and Yt are the dimensions of the snakes recorded at times T and T and G is expressed as per cent unit time (Medaware, 1945; Brown, 1957). The general trend of growth was to decrease in rate as time progressed (Fig. 1). This agrees with observations made on Naja naja by Smith (1943). Wall (1921) reported that young cobras measuring 304.8 mm in length in July averaged 762 mm by the following July and 1,473.2 mm by the end of the fourth year. Assuming that these cobras were hatchlings in July, this closely agrees with our data for the first year of growth (Fig. 2), but we further show (Fig. 1) that their peak length specific growth rate was during their first month of life and that their peak weight specific growth rate was at age 11 months. Our data also show that at age 18 months the cobras were continuing to increase in length (Figs. 1 and 2). There also was a cyclic peak in length specific growth rate approximately each 3 1/2 - 4 months for the first year of growth. Weight peaks were 4-5 months apart during the 18 months that weights were recorded. There appeared to be no correlation between specific-weight growth rate and specific-length growth rate. The cyclic fluctuations of weight and length specific growth rates were apparently not caused by variations in temperature or food intake, so they may have been intrinsic in nature. There was little similarity between the specific-growth rates in our cobras and those of the colubrid Spalerosophis cliffordi (Dmi'el, 1967). When we plotted length and weight against time (Fig. 2), we found length growth was quite similar to that of Spalerosophis cliffordi raised in captivity under artificial heating (Dmi'el, 1967) and somewhat similar to the crotalids Agkistrodon piscivorus (Wharton, 1966), Agkistrodon contortrix (Fitch, 1960), and others that were studied in the wild. The weight growth of our cobras was slower than that reported for N. n. atra which had a mean weight of 15.3 ± .14 g upon hatching and reached a mean weight of 122.6 ± 8.92 g at age 11 months (Petzold, 1968). The mean weight of our cobras at hatching was 19.2 ± 2.49 g and 84.9 ± 3.67 g at age 11 months.

Our snake that refused to eat and died illustrated a length specific growth rate of 13.63% ($\bar{x}$ = 17.85%) during December 1973, and 1.40% ($\bar{x}$ = 3.52%) during January 1974. Its weight specific growth rate was -17.56% ($\bar{x}$ = 16.95%) during December 1973, and -18.09% ($\bar{x}$ = 1.86%) for January 1974. Thus, while this snake remained close to the mean in length specific growth rate, its weight specific growth rate was far below the mean.

We wish to thank the Fort Worth and Houston Zoos for making this study possible. Gary W. Ferguson critically reviewed the original manuscript.

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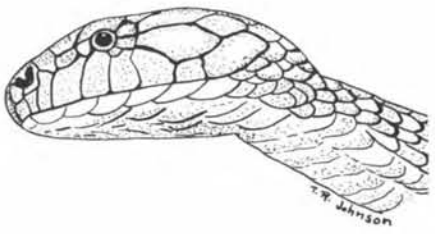
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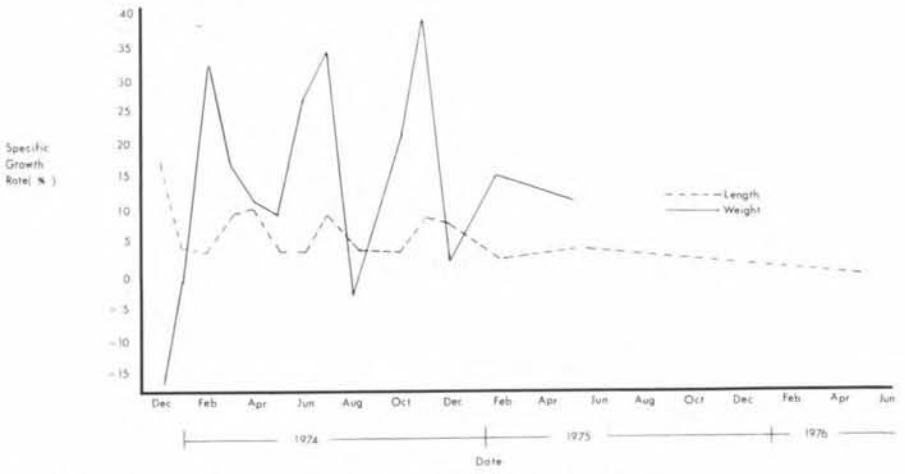


Fig. 1. Weight and length specific growth rate of Naja naja.

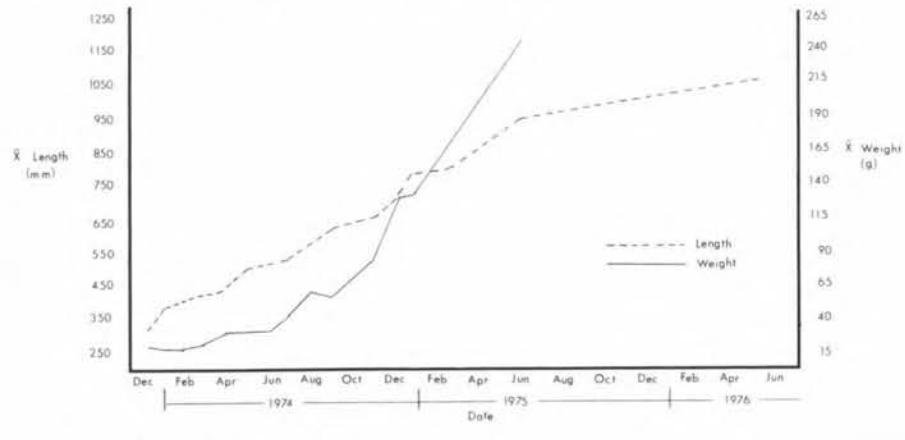


Fig. 2. Weight and length growth of Naja naja.

A Restraining Apparatus for Unanesthetized Snakes

The restraint of snakes has been a problem which has vexed the researcher requiring immobile subjects. Most often the problem has been dealt with by the use of anaesthesia (Brazenor and Kaye, 1975; Karlstrom and Cook, 1955; Betz, 1962; Hackenbrock and Finster, 1963; and Wang, Kubie and Halpern, 1977). However, anaesthesia cannot be used when an alert subject is required, or when the anesthetic might have an effect on the variable being studied. For these situations, mechanical restraint is required. Luck and Keeler (1929) described a "trough" in which their specimens could be securely strapped. Johansen (1959) used a flexible polyvinyl tube with removable perforated stoppers on each end to allow entry of the snakes and to allow air intake. Sutherland and Hampton (1961) used a similar tube; however, instead of using rubber stoppers to prevent escape, they taped the snake's tail to a flat projection at the end of the tube. McDonald (1964) described what is probably the simplest method of immobilizing snakes. He tapes them bodily to round sticks which were slightly greater in diameter than the snake.

These methods of restraint all have certain drawbacks. Tubes limit access to the specimen, and because the tube can never fit any specimen snugly at all points on the body, it allows a certain amount of movement to occur. Taping snakes to rods may damage their skins. This is especially troublesome prior to ecdysis. In addition, all these forms of restraint are not flexible in terms of the size of the snake which any single restraint can handle. If more than one specimen is to be studied, the snakes either have to be closely matched by body diameter, or a different restraint apparatus used for each odd-sized specimen.

In an attempt to circumvent these various problems, the apparatus shown below was designed. It consists of two 36 inch by 2 inch by 1 inch painted boards joined to produce an L-shaped frame which, on the interior of the L, is two inches wide along the horizontal plane and one inch tall along the vertical. Beginning six inches from either end of the vertical board, and extending for 24 inches, is a slot 1/4 of an inch high, flush on its lower edge with the horizontal board. Along the rear surface of the vertical board, and just above the slot, is attached a twenty-four inch strip of coarse velcro (1). On the horizontal board, twelve six-inch long strips of soft velcro are attached soft side down at one-inch intervals perpendicular

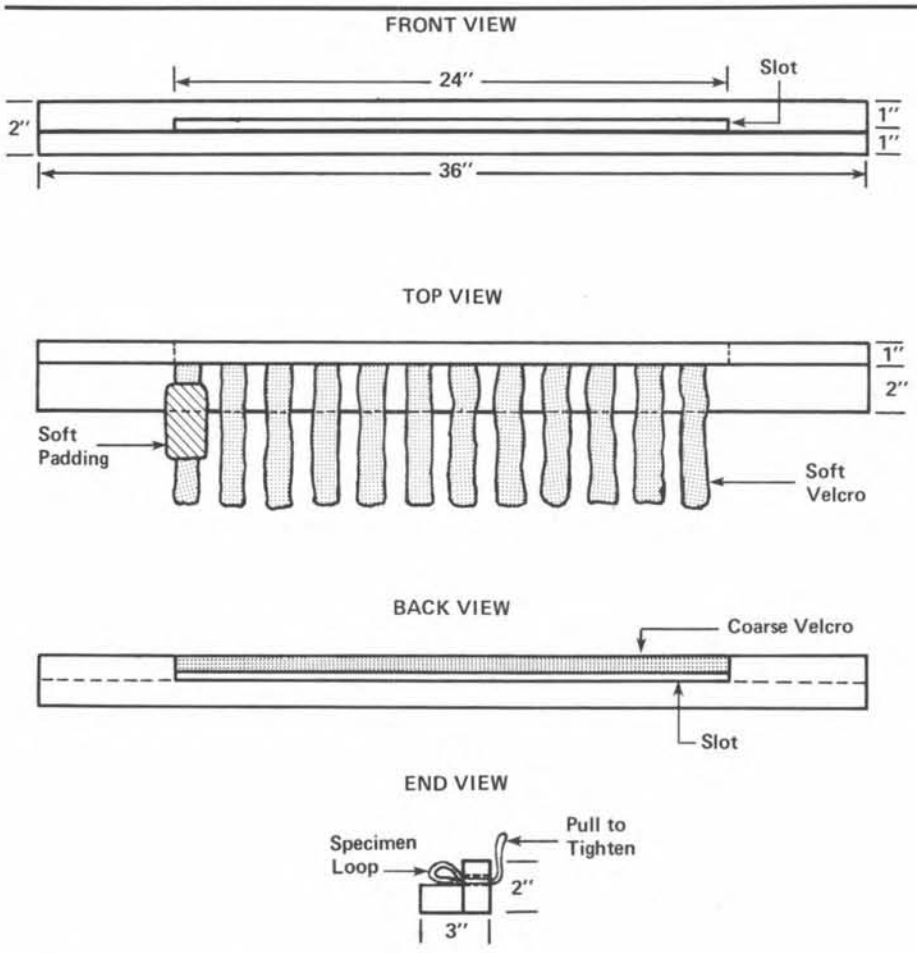


Figure 1. A restraining apparatus for unanesthetized snakes.

to the long axis of the device. These are attached as near the vertical board as possible. To prevent the snake from straining backwards against the velcro and inflicting small lacerations on the back of the head and neck, a soft pad is attached to the first strip of soft velcro.

Strapping a snake into the apparatus is done by laying it on the horizontal board so that the velcro strips are flat beneath the specimen and will extend out from under it. The head of the snake is held so that it is just forward of the padded strip of velcro. This strip is then pulled across the posterior portion of the snake's head, slipped through the slot in the vertical board, drawn firm, and then pressed against the strip of coarse velcro on the rear of the vertical board. This process is repeated with the other strips, beginning with those furthest forward. Care should be taken that the velcro is firm, but not so tight as to impede circulation or respiration. If care is taken when placing the snake in the apparatus, neither escape nor injury is probable.

Our use of this apparatus has, so far, been limited to the study of intermittent reinforcement of tongue flicks in Nerodia rhombifera and Elaphe guttata emoryi. However, the device has the potential to be useful in various types of research. The instrument has shown itself to be adaptable to a wide range of sizes with the two species used. Species with a less distinct head, or species which are very small, might prove troublesome. However, with proper modification, this device should be able to accommodate a large variety of species and various sized specimens.

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FOOTNOTES

(1) Velcro is a self-adhering material sold in 3/4" wide strips and can be obtained at any fabric shop.

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An Observation of Double Clutch Production by Elaphe obsoleta in Captivity

Fitch (1970) hypothesizes that reports of late summer egg clutches of the colubrid snake Elaphe obsoleta, as reported in the literature, may represent second clutches by the same female. In summarizing the literature, Fitch finds the following colubrid snakes confirmed as reproducing twice in the same year: Boeadon lineatus, Pituophis, Ptyas, Spalerosophis, Thamnophis, and Xenochrophis vittata. He also suggests double clutches in other species.

The author received a male Elaphe o. obsoleta 1 January 1975 (captive bred and hatched 19 August 1974) and a female Elaphe obsoleta quadrivittata 19 December 1975 (captive bred and hatched 1972). The pair has been housed together consistently. A single clutch consisting of 10 eggs was deposited 22 April 1976; however, only one of the eggs proved fertile and hatched 11 July after an 80 day incubation period. In late April and early of May 1977 courtship activity was observed. As expected, a clutch of 13 eggs were deposited 19 June. Unexpectedly, however, another clutch of 10 eggs was deposited 17 August. Hatching and viability of data are shown in Table 1. As you can see, the second, smaller clutch had the higher fertility rate though more young died before hatching. Egg size was slightly larger in the second clutch while incubation period was insignificantly shorter. While both adult snakes fall within the size parameters given by Conant (1975), the

female seems unusually small at about four feet.

Table 1

Date of Clutch Deposit	19 June 1977	17 August 1977
Average Egg Size	34 x 16mm	39 x 18mm
Clutch Size	13	10
Fertile	9	7
Infertile	2	0
Number Dead	2	3
"Net" Clutch Size	84.6%	100%
Date of Hatching	8/25-29	10/19-21
Incubation Period (Days)	67-71	63-65

Elapsed time between clutches: 59 days

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Legislative Alert

Legislative News

Since the last issue, the following rulemaking actions have taken place --

Proposed regulations:

1) The U.S. Fish and Wildlife Service proposed the San Marcos salamander (Eurycea nana) for Threatened status and its range (Hays County, Texas) as Critical Habitat (F. R., Vol. 43, No. 136, 14 Jul 78). Public comment period closed 15 September 1978.

2) The U.S. Fish and Wildlife Service proposed the Beaver Dam Slope population (Washington County, Utah) for Endangered status and its range as Critical Habitat (F. R., Vol. 43, No. 164, 23 Aug 78). Public comment period closed 23 October 1978.

Final regulations:

The U.S. Fish and Wildlife Service has determined the New Mexican ridge-nosed rattlesnake (Crotalus willardi obscurus) to be a Threatened species, and its known range in southwestern New Mexico has been designated as Critical Habitat (F. R., Vol. 43, No. 151, 4 Aug 78).

NOTICE: A meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora is scheduled for March 19-31, 1979 in San Jose, Costa Rica. Rule changes regarding CITES-listed organisms are expected. ●

New Illinois Regulation

Collecting snakes from the Murphysboro dens vicinity in the Little Grand Canyon/Horseshoe Bluff/Chalk Bluff area of Jackson County, Illinois is now prohibited except under permit from the District Ranger, Murphysboro Ranger District, Shawnee National Forest. The general area lies between the Muddy River and, to the east, Cedar Creek, with Swallow Rock to the north and Lookout Rock south. Maps of the precise area are available from the District Ranger. ●

California Collectors Cited

Two California men were fined $672.00 each for collecting reptiles in the Huachuca Mountains, near Sierra Vista, Arizona. They were cited for three violations. One was for collecting without an Arizona hunting license, one for possessing non-native venomous reptiles (S. Pacific rattlesnakes) and the third for transporting non-native venomous reptiles. Each violation carries a fine of $224.00.

Leonard Contreras of El Segundo, Calif., and Daniel Havens of Arroyo Grande, Calif., were asking local residents about places to collect Ridge-nosed Rattlesnakes and local residents reported them to the Arizona Game and Fish officials via the newly installed toll free "Hot Line", according to Phil Cosner, Assistant Director of the Game and Fish Department. In addition to the fines, the specimens and collecting equipment were confiscated.

...from Arizona Herp. Association Newsletter, 8(11): 5 (October 1978). ●

Regional Society News

New Herp Society

The North Carolina Herpetological Society was formed in May 1978 and held its initial organizational meeting at the NC State Museum of Natural History. The NCHS issued its first newsletter (Volume 1, number 1) entitled "NC Herps" in August 1978. Dave Stephan has been elected chairperson of the NCHS steering committee, and Pat Ashton will serve as secretary. Individuals wishing to join or learn more about the NCHS should contact: Ms. Pat Ashton, NC State Museum of Natural History, P. O. Box 27647, Raleigh, North Carolina 27611. ●

Regional Herp Society Omitted

The SSAR Directory of Regional Herpetological Societies which appeared in Herp. Review, 9(3): 105-106, was incomplete. Inadvertantly omitted from the directory was the PALM BEACH COUNTY HERPETOLOGICAL SOCIETY, 4422 Birdwood Street, Palm Beach Gardens, Florida 33410. SSAR members should correct their directories accordingly. ●

New Herpetological Society Proposed

Operating currently within the New England area are three separate herpetological societies: the Massachusetts Herpetological Society which is based in Boston, the Connecticut Herpetological Society whose meetings are held at many and varied localities throughout the state and the Springfield-based Western Massachusetts Herpetological Society. Communications between the three organizations are, traditionally, poor at best. In an effort to open wide the door of communication and knowledge, a proposal has been made by Howard L. Freeman, a professor at Springfield College and member of the board of directors of the WMHS, for the organization of a more broadly-based society to be called the "NEW ENGLAND HERPETOLOGICAL SOCIETY".

The details of this proposal have not yet been finalized, but it would be hoped that the NEHS would become a grandfather to all current and future locally-based societies, augmenting and adding a cohesiveness to the efforts of these clubs.

Meetings would be held a minimum of twice a year at various suitable locations. Plans for a publication of recognized authority within the herpetological field are also being made, within which articles and notes on the ecology, taxonomy, husbandry, range extensions, etc., would be published.

Howard Freeman would appreciate hearing from any persons that would have an interest in such a society and whom may have ideas or suggestions for its formation. Write: Howard L. Freeman, Department of Biology, Springfield College, 263 Alden Stret, Springfield, Massachusetts 01109. ●

Societe Herpetologique de France (French Herpetological Society)

The French Herpetological Society (SHF) has been active since 1970. Membership includes both professional and amateur herpetologists and now totals approxmately 500 members. A quarterly internal newsletter is

published. Local and general meetings are held each year in connection with other European herpetological societies.

Current projects include accurate mapping of all French species and emphasis is put on protection of endangered species in France and overseas.

For further information and applications for membership, write to one of the SHF officials (addresses below).

SEND ALL DUES TO: Societe Herpetologique de France, 7 Quai St., Bernard 75230, Paris CEDEX FRANCE.

PRESIDENT: Dr. Guy Naulleau, Centre d'etude biologique des animaux sauvages/CNRS, 79360 Villiers en Bois.

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Foreign memberships are welcome. ●

Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Standard Common and Current Scientific Names for North American Amphibians and Reptiles (Collins, Huheey, Knight and Smith, 1978). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Department of Biology, Virginia Commonwealth University, Richmond, Virginia 23284. Short manuscripts are only acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

CAUDATA

AMBYSTOMA ANNULATUM (Ringed Salamander). USA. ARKANSAS: Montgomery Co., Big Brushy Recreation Area, 9.3 km NW Pencil Bluff. 1 April 1973. R. T. Allen and P. D. Kittle. Identified by P. D. Kittle. Univ. Ark. Mus., 76-225-1. First record for county and fourth for Ouachita Mountains (Anderson, 1965. Cat. Amer. Amph. Rept., 19.1). The specimen was discovered under leaf litter in woods dominated by Quercus spp.

Submitted by PAUL D. KITTLE, Department of Biology, Hartwick College, Oneonta, New York 13820. ●

SALIENTIA

HYLA EXIMIA (Mountain Treefrog). USA. NEW MEXICO: Catron Co: head of McKenna Creek, 14.2 km W Gila Cliff Dwellings Nat. Mon., R 15 W, 5 12 S, section 30. 11 June 1972. D. L. Hunt. New Mexico St. Univ. collection, NMSU 3685-6. Head of Little Dry (Creek), 15 KM E and 8.3 km S Glenwood, R 18 W, T 12 S, section 20. 17 July 1971. D. L. Hunt. Verified by A. H. Price. NMSU 3824. Stebbins (1966), Cochran and Goin (1970). The New Field Book of Reptiles and Amphibians, G. P. Putnam's Son, NY, 359 00.) and Duellman (1970. The Hylid Frogs of Middle America, Museum of Natural History, University of Kansas, 753 pp.) indicate this species occurs in the mountains of west-central New Mexico, but we have been unable to determine whether or not this is based on extant specimens. This species appears to be rare in New Mexico in any case, and we feel this warrants bringing the existence of these specimens to the attention of the herpetological community.

Submitted by ANDREW H. PRICE and DANE G. JOHNSON, Department of Biology, New Mexico State University, Las Cruces, New Mexico 88003. ●

TESTUDINES

TRIONYX SPINIFERUS HARTWEGI (Western Spiny Softshell). USA. OKLAHOMA: Creek and Okfuskee Co: 4.8 km E Welty, Deep Fork of the Canadian River. 4 July 1977. Hank and Shawn Shannon. Webster Nat. Hist. Mus. 204-77. New county records in central park of Oklahoma range (Webb, 1970, Reptiles of Oklahoma, U. Oklahoma Press).

Submitted by JEFFREY H. BLACK and SANDRA LYNN SHANNON, Department of Biology, Oklahoma Baptist University, Shawnee, Oklahoma 74801. ●

SERPENTES

CARPHOPHIS AMOENUS HELENAE (Midwest Worm Snake). USA. ARKANSAS: Greene Co: 8 km W Paragould, Campus Crowley's Ridge College. 15 Sept. 1977. S. M. Bounds. Crowley's Ridge Coll. Mus. Zool., CRCMZ H-022. Cross Co: Village Creek State Park. One specimen photographed and released Fall 1977, one specimen preserved Spring 1978. RF private collection. First records of this snake west of the Mississippi River (Dowling, H. G. 1957. Occ. Pap. U. Ark. Mus. 3: 1-51; Anderson, P. 1965. The reptiles of Missouri. U. Mo. Press, Columbia. 330 p.). All three specimens come from Crowley's Ridge representing localities 104 km apart; no specimens of C. a. vermis are known from this area. Additionally, all specimens examined from a few km west, in the Ozark foothills, are referable to C. a. vermis. It appears that C. a. helenae occupies at least Crowley's Ridge in the Mississippi Delta of NE Arkansas and C. a. vermis the rest of the state.

Submitted by V. R. McDANIEL, Department of Biology, Arkansas State University, State University, Arkansas 72467; S. M. BOUNDS, Department of Science, Crowley's Ridge College, Paragould, Arkansas 72450; R. FRAZIER, Village Creek State Park, Wynne, Arkansas 72396; and K. B. SUTTON, Department of Biology, Arkansas State University, State University, Arkansas 72467. ●

CROTALUS SCUTULATUS SCUTULATUS (Mojave Rattlesnake). USA. UTAH: Washington Co: 20.9 km SW of bridge over Santa Clara River on Rte. 91 (Old Las Vegas Highway). 30 May 1978. M. R. Nadeau. Verified by A. Clayburn, Snow Canyon State Park, Box 140, Santa Clara, UT. Extends the published range 17.0 km WNW from Lincoln Co, NV (Stebbins, R. 1966. A Field Guide to Western Reptiles and Amphibians, Houghton Mifflin Co., Boston), but this is not the first record for Utah (Tanner, W. W., 1975. Checklist for Utah Amphibians and Reptiles. Proc. of Utah Acad. of Sciences, Arts, and Letters, vol. 52, part 1, 1975). Specimen was given to Supt. Clayburn for release. See photo on opposite page.

Submitted by MARC R. NADEAU, Division of Herpetology, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

RHINOCHEILUS LECONTEI TESSELLATUS (Texas Longnose Snake). USA. OKLAHOMA: Grandy Co: Rush Springs, at junction of US Hwy 81 and State Hwy 17. 22 May 1978. C. M. Mather. Univ. Sci. Arts of Oklahoma Verte-

Herpetological Review Annual Index

Volume 8 1977

Acuna, Mercedes L.

a. Contribution to the comparative cytomorphology of hylid frogs from Venezuela (abstr.). 8(3) supplement: 1.
b. Hematological observations on some anurans from Venezuela (abstr.). 8(3) supplement: 1. With Felicia C. Rodulfo.

Aldridge, Robert D.

See Weil.

Altimari, William

See Groves.

Anderson, Marshall L.

Myological studies on the relationship between the anuran prepollex and prehallux (abstr.). 8(3) supplement: 1.

Andrews, Robin M.

Regulation of population size in a tropical lizard, Anolis limifrons (abstr.). 8(3) supplement: 1. With A. Stanley Rand and S. Guerrero.

Anonymous

a. SSAR member support strong. 8(1): 7.
b. SSAR conservation fund grows. 8(1): 7.
c. Pisani needs dirt. 8(1): 14.
d. Georgia Herpetological Society. 8(1): 14.
e. Wanted: herpetological papers for publication. 8(1): 14.
f. Biology of the Reptilia: volume III. 8(1): 14.
g. Nicaraguan amphibians. 8(1): 14.
h. ASIH at Gainesville, Florida. 8(1): 14.
i. Cincinnati collection returns to museum. 8(1): 14.
j. Turtle hobbyist newsletter available. 8(1): 14.
k. Pressure from pet turtle industry. 8(1): 15.
l. Fort Worth Zoo needs Rhinobothryum. 8(1): 15.
m. Python data needed. 8(1): 15.
n. Costa Rican herp project. 8(1): 15.
o. New York Zoo tortoise breeding. 8(1): 15.
p. Change in alligator status. 8(1): 15.
q. Hobart Smith recognized. 8(2): 41.
r. Anderson memorial established. 8(2): 41.
s. Future SSAR meetings. 8(2): 41.
t. SSAR Facsimile Committee. 8(2): 41.
u. Herp stamp book available. 8(2): 41.
v. Das Tierreich issue available. 8(2): 42.
w. Second annual reptile symposium. 8(2): 42.
x. Mexican fauna confiscated. 8(2): 42.
y. St. Louis Herpetological Society. 8(2): 42.
z. SSAR-HL meeting titles. 8(2): 67-68.
aa. SSAR Conservation Committee for 1977. 8(3): 84.
bb. French Herpetological Society. 8(4): 122.
cc. Herpetological news at the Smithsonian. 8(4): 131.
dd. Obituary of: Richard James Holub. 8(4): 131.
ee. SSAR prize for best student journal paper. 8(4): 132.
ff. The Theodore Roosevelt Memorial Fund. 8(4): 132.
gg. HR editors and staff are grateful. 8(4): 132.
hh. Collins on leave during 1978. 8(4): 132.

Ashton, Patricia S.

See Ashton, Ray E., Jr.

Ashton, Ray E., Jr.

Investigation into the natural history of Pseudacris ornata in north central Florida--preliminary report (abstr.). 8(3) supplement: 1. With Patricia Ashton and David Deitz.

Baez, Ana M.

a. History of the South American herpetofauna: a paleontological approach (abstr.). 8(3) supplement: 1. With Zulma B. de Gasparini.
b. Late Cenozoic environmental changes in present temperate South America (abstr.). 8(3) supplement: 2. With Gustavo Scillato.

Bagnara, Joseph T.

Leopard frog supply. 8(4): 118-119. With John S. Frost.

Baker, Wahleah

a. See Phillips (a).
b. See Williams (b).

Ball, Robert

See Ford.

Bartlett, Grant R.

Phosphate compounds in reptilian red cells (abstr.). 8(3) supplement: 2.

Behler, John

A propagation program for Chinese alligators (Allibator sinensis) in captivity. 8(4): 124-125.

Berger, Thomas J.

a. Legislation and rulemaking re herps. 8(2): 37-38.
b. Legislation. 8(4): 130-131.

Black, Jeffrey Howard

An albino Ambystoma tigrinum mavortium from Kansas. 8(1): 5. With Joseph T. Collins.

Blackeney, W. Carlyle, Jr.

Response to Lazell's letter on alligators. 8(2): 36-37.

Bloomer, Tom J.

Muhlenberg group sponsors ESHL meet. 8(3): 85.

Bogart, James P.

Evolutionary relationships of frogs in the

neotropical family Dendrobatidae (abstr.). 8(3) supplement: 2.

Bowler, J. Kevin

Bowler responds to Ross. 8(2): 37.

Brandon, Ronald A.

a. Defensive behavior in the plethodontid salamanders Pseudotriton montanus and P. ruber (abstr.). 8(3) supplement: 2. With George M. Labanick and James E. Huheey.
b. See Huheey (b).

Branham, Arthur E.

Development of the urostyle during metamorphosis (abstr.). 8(3) supplement: 2. With James C. List.

Brown, William S.

Snake communities: a review with suggestions for research (abstr.). 8(3) supplement: 3. With William S. Parker.

Bull, James J.

See Shine.

Burghardt, G.M.

See Denny.

Bury, R. Bruce

Sampling herpetological communities by a removal method (abstr.). 8(3) supplement: 3.

Butler, Joseph A.

The physiological and behavioral mechanisms that relate to feeding strategies of Regina septemvittata during environmental temperature extremes (abstr.). 8(3) supplement: 3.

Campbell, Howard W.

a. Analysis of the herpetofauna of Florida longleaf pine-turkey oak (sandhill) habitat (abstr.). 8(3) supplement: 3.
b. Techniques for herpetofaunal community analysis (abstr). 8(3) supplement: 3. With Steven P. Christman.
c. See Scott, Norman J., Jr. (b).

Castillo, Carmen Cecilia

See Ramirez.

Cei, Jose M.

Temperate herpetofaunas: Patagonia (abstr.). 8(3) supplement: 4.

Chambers, R. Christopher

Energetics in different life histories of Ambystoma tigrinum (abstr.). 8(3) supplement: 4.

Christman, Stephen P.

a. See Campbell.
b. The herpetofauna of Florida sand-pine scrub (abstr.). 8(3): 4.

Colbert, Sylvia

See Ralin.

Collier, Alan D.

Cinematographic techniques in herpetological education (abstr.). 8(3) supplement: 4.

Collins, Joseph T.

a. See Black.
b. See Tucker.

Crevsere, F. Michael

Variation of diel activity of a Chihuahuan desert lizard community (abstr.). 8(3) supplement: 5. With Walter G. Whitford.

Crump, Martha L.

a. The significance of reproductive ecology in frogs and its relevance to the study of anuran communities (abstr.). 8(3) supplement: 5.
b. See Kaplan.

Cundall, David L.

See Rossman.

Cupp, Paul V., Jr.

Aggressive behavior in the green salamander, Aneides aeneus (abstr.). 8(3) supplement: 5.

Deitz, David

See Ashton, Ray E., Jr.

Denny, W. D.

Effect of tongue removal on the feeding behavior of an adult garter snake Thamnophis sirtalis (abstr.). 8(3) supplement: 5. With G. M. Burghardt and R. P. Saunders.

di Tada, Ismael

Reproductive cycle and feeding behaviour of Cupriguanus achalensis (Sauria, Iguanidae) (abstr.). 8(3): 6. With R. Martori, B. Kufner, and A. Ocana.

Dixon, James R.

Origin and distribution of reptiles of lowland tropical rainforests of South America (abstr.). 8(3) supplement: 6.

Dole, Jim W.

See Durant (b).

Drewes, R.C.

Integumentary structures correlated with uricotely in an African treefrog (abstr.). 8(3) supplement: 6. With S. S. Hillman, R. W. Putnam, and O. M. Sokol.

Duda, P. L.

a. A case of gonadal atrophy in Lissemys punctata punctata (Bonnet.) (Reptilia, Testudines, Trionychidae). 8(3): 75-76. With V. K. Gupta.
b. A kyphotic individual of Lissemys punctata punc-

tata (Bonneterre). 8(4): 119-120. With V. K. Gupta.

Duellman, William E.

a. Announcement joint annual meting-HL and SSAR. 8(1): 2.
b. Review of: Nepalese frogs: the subgenus in herpetological classification. By Alain Dubois. 8(1): 11-12.
c. Herpetology at the University of Kansas. 8(2): 30-32.
d. Review of: Australian frogs; how they strive, thrive, and stay alive. By Michael J. Tyler. 8(3): 83.
e. The acoustical niche: auditory resource partitioning in anuran communities (abstr.). 8(3) supplement: 6.
f. Origin, evolution and dispersal of the Andean herpetofauna (abstr.). 8(3) supplement: 7.
g. See Pefaur.

Durant, Pedro

a. Ecological distribution of the salientan fauna of the Merida Andes, Venezuela (abstr.). 8(3) supplement: 7.
b. Amphibian ecology of the Venezuelan Andes (abstr.). 8(3) supplement: 7. With Jim W. Dole.

Earnhart, Vickie

A comparison of thermal time constant of aquatic and terrestrial turtles (abstr.). 8(3) supplement: 7. With E. Norbert Smith.

Echternacht, Arthur C.

A zoogeographic analysis of the herpetofauna of the West Indies (abstr.). 8(3) supplement: 8.

Edwards, James L.

Terrestrial locomotion in salamanders: gait analysis (abstr.). 8(3) supplement: 8.

Edwards, Stephen R.

a. SSAR 1976 annual meeting (Oxford, Ohio). 8(1): 3-4.
b. SSAR meeting in Lawrence well attended. 8(4): 114-116.

de Espinoza, Nelly C.

New records of colubrid snakes from Peru, with notes on their ecology and distribution (abstr.). 8(3) supplement: 3.

Fitch, Henry S.

a. Partitioning of food resources in snakes of The University of Kansas Natural History Reservation (abstr.). 8(3) supplement: 8.
b. Structure and function of anole dewlaps (abstr.). 8(3) supplement: 8. With Virginia R. Fitch.

Fitch, Virginia R.

See Fitch, Henry S. (b).

Ford, Neil B.

Clutch size and size of young in the Mexican garter snake, Thamnophis melanogaster (Reptilia, Serpentes, Colubridae). 8(4): 118. With Robert Ball.

Formas C., Ramon

The herpetofauna of the Nothofagus forests of southern Chile (abstr.). 8(3) supplement: 8.

Frost, John S.

See Bagnara.

Funk, Richard S.

See Tucker.

Gallardo, Jose M.

Composition, distribution and origin of the Chacoan herpetofauna (abstr.). 8(3) supplement: 8.

Garber, Steven D.

First RHSC a huge success. 8(4): 120-122.

de Gasparini, Zulma B.

See Baez (a).

Gorman, George C.

Sample size in taxonomic electrophoretic studies--an empirical analysis (abstr.). 8(3) supplement: 9.

Gorzula, S. J.

a. The ecology of the spectacled caiman in the Venezuelan Guayana (abstr.). 8(3) supplement: 9.
b. See Ramirez.

Greene, Harry W.

Behavior, ecology, and the adaptive zone of the African mole vipers (Atractaspis) (abstr.). 8(3) supplement: 9.

Groves, John D.

Keratophagy in the slender vine snake, Uromacer oxyrhynchus. 8(4): 124. With William Altimari.

Guerrero, S.

See Andrews.

Gupta, V.K.

a. See Duda (a).
b. See Duda (b).

Haffer, Jurgen

Quaternary biogeography of tropical lowland South America (abstr.). 8(3) supplement: 9.

Hanken, James

See Wake (a).

Harding, James H.

Record egg clutches for Clemmys insculpta. 8(2): 34.

Heatwole, Harold

A review of structuring in herpetological communities (abstr.). 8(3) supplement: 9.

Hedges, S. Blair

The presence of the scarlet kingsnake, Lampropeltis triangulum elapsoides Holbrook (Reptilia, Serpentes, Colubridae), in the Florida Keys. 8(4): 125-126.

Hillman, S. S.

See Drewes.

Hodl, Walter

a. Call differences and calling site segregation in anuran species from central Amazonian floating meadows (abstr.). 8(3) supplement: 10.
b. Distress calls in central Amazonian frogs (abstr.). 8(3) supplement: 10.

Hoff, James G.

A Massachusetts hibernation site of the red-backed salamander, Plethodon cinereus. 8(2): 33.

Hoogmoed, Marinus S.

The herpetofauna of Guiana, an appraisal of our current knowledge (abstr.). 8(3) supplement: 10.

Huheey, James E.

a. See Brandon (a).
b. Novel toxins and the question of warning coloration and mimicry in salamanders (abstr.). 8(3) supplement: 10. With Ronald Brandon.

Hulse, Arthur C.

New distributional records for amphibians and reptiles from the provinces of Catamarca, La Rioj, and Cordoba, Argentina. 8(2): 40.

Jackson, James F.

Differentiation in the genera Enyalius and Strobilurus (Iguanidae): Implications for Pleistocene climatic changes in eastern Brazil (abstr.). 8(3) supplement: 10.

Juterbock, J. Eric

The taxonomic status of Desmognathus welteri barbour and a comparison with two sympatric congeners (abstr.). 8(3) supplement: 11.

Kaplan, Robert H.

The non-cost of brooding in Ambystoma opacum (abstr.). 8(3) supplement: 11. With Martha L. Crump.

Kennedy, J. P.

In memoriam: Bertha Lutz--naturalist-feminist (1894-1976). 8(1): 8.

Kochman, Howard D.

Differentiation and hybridization in the Natrix fasciata complex (Reptilia: Serpentes): a nonmorphological approach (abstr.). 8(3) supplement: 11.

Kufner, B.

See di Tada.

Labanick, George M.

See Brandon (a).

Laurent, Raymond F.

Herpetofaunal relationships of South America with Africa (abstr.). 8(3) supplement: 11.

Lawler, Howard E.

The status of Drymarchon corais couperi (Holbrook), the eastern indigo snake, in the southeastern United States. 8(3): 76-79.

Leon, Juan R.

The herpetofauna of the llanos and associated non-forest regions of northern South America (abstr.). 8(3) supplement: 12.

Lillywhite, Harvey B.

Tracking as an aid in the study of snake communities (abstr.). 8(3) supplement: 12.

List, James C.

See Branham.

Lovejoy, Thomas E.

Refugia, refuges and minimum critical size: problems in the conservation of the neotropical herpetofauna (abstr.). 8(3) supplement: 12.

Lynch, John D.

The amphibians of the lowland tropical forests of South America (abstr.). 8(3) supplement: 12.

Malnate, Edmund V.

In memoriam: Isabelle Hunt Conant (1901-1976). 8(1): 9.

Mamonov, George

Review of: The palearctic desert lizards. By N. N. Scherbak. 8(1): 11.

Martori, R.

See de Tada.

Mautz, William T.

Utilization of cave resources by a lizard community (abstr.). 8(3) supplement: 13.

Maxson, Linda R.

See Wake (b).

McNulty, John A.

See Schwalm.

Mecham, John S.

See Sattler.

Middendorf, George, III.

The energetic basis of social behavior: lizard social structures (abstr.). 8(3) supplement: 13. With Wilfred M. Post, III.

Miller, Kirk

Activity metabolism in the mudpuppy, Necturus maculo-

sus (abstr.). 8(3) supplement: 13.

Moody, Scott

An open letter on agamid lizards. 8(3): 89.

Nelson, Craig

a. Comparison of "naturalistic" and quadrat approaches in the analysis of a Brazilian frog community (abstr.). 8(3) supplement: 14.
b. Amphibian communities in southern Indiana: factors influencing species composition in ponds (abstr.). 8(3) supplement: 14.

Nickerson, Max A.

a. Support Galapagos program. 8(1): 9-10.
b. Newsletter of the Madras Snake Park Trust. 8(1): 10.
c. Proposed endangered species. 8(1): 10.
d. Madras crocodile bank trust. 8(2): 36.

Ocana, A.

See di Tada.

Osgood, David William

Temperature induced anomolies in Natrix fasciata (abstr.). 8(3) supplement: 14.

Otvos, Imre S.

Observations on the food of three forest-dwelling lizards in California. 8(1): 6-7.

Packard, Gary C.

a. See Packard, Mary J. (a).
b. See Tracy (b).

Packard, Mary J.

a. Scanning electron microscopy of eggs of squamata (abstr.). 8(3) supplement: 14. With C. Richard Tracy and Gary C. Packard.
b. See Tracy (b).

Parker, William S.

See Brown.

Pefaur, Jaime E.

Community structure in high Andean herpetofaunas (abstr.). 8(3) supplement: 14. With William E. Duellman.

Penna V., Mario

See Veloso M.

Pettus, David

A preliminary study of skin surface sculpturing in toads (abstr.). 8(3) supplement: 14. With Tyler A. Woolley.

Phillips, Robert

a. Effects of DNA biosynthetic inhibitors on bullfrog tadpoles during thyroid hormone induced metamorphosis (abstr.). 8(3) supplement: 14. With James Williams, Wahleah Baker. and Gary VanDenbos.
b. See Williams (b).

Plummer, Michael V.

a. Observations on breeding migrations of Ambystoma texanum. 8(3): 79-80.
b. Activity, habitat, and population structure in the turtle, Trionyx muticus (abstr.). 8(3) supplement: 15.

Post, Wilfred M., III.

See Middendorf.

Putnam, R.W.

See Drewes.

Ralin, Dennis B.

Morphological variation in a diploid-tetraploid species complex of treefrogs (abstr.). 8(3) supplement: 15. With James S. Rogers and Sylvia Colbert.

Ramirez, Yolanda

Projecto Venezolano sobre cocodrilos (Venezuelan crocodile project). 8(4): 130. With Carmen Cecilia Castillo and S. J. Gorzula.

Rand, A. Stanley

See Andrews.

Reynolds, Robert

Use of a mammalian resource by a Chihuahuan snake community (abstr.). 8(3) supplement: 15.

Ringler, Steven B.

The herpetofauna of Ossabaw Island, Chatham County, Georgia. 8(2): 39.

Rodulfo, Felicia C.

See Acuna (b).

Rogers, James S.

See Ralin.

Ross, Charles A.

Response to Bowler's letter on aligators. 8(2): 37.

Rossi, John

See Stewart.

Rossman, Douglas A.

Comparative cranial osteology of Farancia and Pseudoeryx: systematic implications(abstr.). 8(3) supplement: 15. With David L. Cundall.

Sattler, Paul W.

Hybridization in spadefoot toads (abstr.). 8(3) supplement: 16. With John S. Mecham.

Saunders, R. P.

See Denny.

Savitzky, Alan H.

The elaboration of venom systems in snakes (abstr.). 8(3) supplement: 16.

Schleich, H. H.

Distributional maps of reptiles of Iran. 8(4): 126-129.

Schwalm, Patricia A.

Comparison of chromatophore ultrastructure in neotropical and centrolenid frogs (abstr.). 8(3) supplement: 16. With John A. McNulty.

Schwaner, Terry D.

Review of: This broken archipelago: Cape Cod and the islands, amphibians and reptiles. By James D. Lazell, Jr., with photographs by Martin C. Michener. 8(3): 80-81.

Scillato, Gustavo

See Baez (b).

Scott, John R.

Seasonal shift in the temperature preferendum of the wandering garter snake (abstr.). 8(3) supplement: 16.

Scott, Norman J., Jr.

a. The herpetofauna of forest litter plots from Cameroon (abstr.). 8(3) supplement: 16.
b. The status of studies of herpetological communities and suggestions for future research (abstr.). 8(3) supplement: 16. With Howard W. Campbell.

Seibert, Henri C.

a. Review of: Salt glands in birds and reptiles. By M. Peaker and J. L. Linzell. 8(1): 10.
b. SSAR treasurer's report for 1976. 8(2): 43.

Sever, David M.

Deposition of paratypes of Eurycea junaluska. 8(2): 32.

Shine, Richard

Low frequences of reproduction in iteroparous organisms (abstr.). 8(3) supplement: 16. With James J. Bull.

Simmons, John E.

Reproduction of the Chinese red snake, Dinodon rufozonatum (Cantor) in captivity. 8(2): 32.

Simpson, Beryl B.

Quartenary biogeography of the South American highlands (abstr.). 8(3) supplement: 17.

Smith, Charles R.

Food resource partitioning of burrowing sand-pine scrub reptiles (abstr.). 8(3) supplement: 17.

Smith, E. Norbert

a. See Earnhart.
b. Growth and movement of alligators in south Texas (abstr.). 8(3) supplement: 17.

Sokol, O. M.

See Drewes.

SSAR Liaison Committee

Regional herpetological societies. 8(3): 85-87.

Stewart, Margaret M.

The Albany pine-bush--a northern herpetological outpost for southern species in New York (abstr.). 8(3) supplement: 17. With John Rossi.

Taplin, Gerald

See Vance.

Tarnowski, Betty I.

The effect of chlorine on the development of Rana pipiens eggs (abstr.). 8(3) supplement: 17.

Thomas, Kim R.

See Thomas, Richard.

Thomas, Richard

Distributional records of amphibians and reptiles from Puerto Rico. 8(2): 40. With Kim R. Thomas.

Thomas, Robert A.

Genus, or subgenus: that is the question (abstr.). 8(3) supplement: 18.

Toft, Catherine Ann

Partitioning of food in a community of tropical frogs (abstr.). 8(3) supplement: 18.

Tracy, C. Richard

a. See Packard, Mary J. (a).
b. The dynamics of water exchange by eggs of painted turtles (Chrysemys picta) (abstr.). 8(3) supplement: 18. With Gary C. Packard and Mary J. Packard.

Trauth, Stanley E.

a. Winter collection of Cnemidophorus sexlineatus eggs from Arkansas. 8(2): 33.
b. Collection of hibernating Cnemidophorus sexlineatus (Lacertilia: Teiide) from various parts of its range (abstr.). 8(3) supplement: 18.

Tryon, Bern W.

Reproduction in captive lower California rattlesnakes, Crotalus enyo enyo (Cope). 8(2): 34-36.

Tucker, John K.

Distributional notes on Kirtland's water snake, Clonophis kirtlandi (Kennecott). 8(2): 40-41. With Richard S. Funk and Joseph T. Collins.

Tyler, Michael J.

Herpetofaunal relationships of South America with Australia (abstr.). 8(3) supplement: 18.

Tyning, Thomas F.

A yellow albino Desmognathus fuscus from western Massachusetts. 8(4): 118.

Vance, Thomas

Another yellow albino amphibian. 8(1): 4-5. With Gerald Taplin.

VanDenbos, Gary

a. See Phillips (a).
b. See Williams (b).

Veloso M., Alberto

Structural patterns of spontaneous and evoked calls in the Bufo spinulosus species group (Amphibia-Bufonidae) (abstr.). 8(3) supplement: 19. With Mario Penna V.

Vigle, Gregory O.

The history and distribution of an introduced population of Lacerta muralis (Reptilia, Sauria, Lacertidae), in Cincinnati (abstr.). 8(3) supplement: 19.

Villa, Jaime

Amphibian eggs: a neglected microhabitat (abstr.). 8(3) supplement: 19.

Wake, David B.

a. Herpetology at the University of California-Berkeley. 8(3): 74-75. With James Hanken.
b. Genetic differentiation, albumin evolution, and their biogeographic implications in plethodontid salamanders (genus Hydromantes) of California and southern Europe (abstr.). 8(3) supplement: 19. With Linda R. Maxson and Gloria Z. Wurst.

Weil, Michael R.

The effects of temperature on the reprodutive cycle of the male water snake, (Natrix sipedon) (abstr.). 8(3) supplement: 19. With Robert D. Aldridge.

Werner, Yehuda L.

Herpetofaunal survey of the Sinai Peninsula (1967-1977) (abstr.). 8(3) supplement: 20.

Whetstone, K. N.

Platysternon and the evolution of chelydrid turtles (abstr.). 8(3) supplement: 20.

Whitford, Walter G.

See Creusere.

Wiest, John A., Jr.

Anuran succession at temporary ponds in a post oak savanna region (abstr.). 8(3) supplement: 20.

Williams, James

a. See Phillips (a).
b. Effect of thyroid hormone on hepatic cell proliferation and turnover in the bullfrog tadpole (abstr.). 8(3) supplement: 20. With Wahleah Baker, Robert Phillips and Gary Van Denbos.

Woolley, Tyler A.

See Pettus.

Wurst, Gloria Z.

See Wake (b).

Zweifel, Richard G.

Review of: Liste der rezenten Amphibien und Reptilien. Hylidae, Centrolenidae, Pseudidae. By William E. Duellman. 8(3): 81-83.

Agama

Duellman. 8(2): 32. research at KU.

Agamidae

Moody. 8(3): 89. generic revisions and species synonymies.

Agkistrodon piscivorus

Lawler. 8(3): 76-79. commensal with gopher tortoises.

Alligator mississippiensis

USDI. 8(1): 15. change in legal status proposed.
USDI. 8(2): 37. final status change.
Ringler. 8(2): 39. range.
Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).
Smith. 8(3) supplement: 17. growth and movements (abstr.).

Alligator sinensis

Behler. 8(4): 124-125. captive propagation.

Alsophis

Thomas. 8(3) supplement: 18. taxonomy (abstr.).

Ambystoma annulatum

McDaniel and Saugey. 8(2): 38. range and associates.

Ambystoma gracile

O'Hara. 8(2): 38. range.

Ambystoma maculatum

McDaniel and Saugey. 8(2): 38. associates.
Plummer. 8(3): 80. feeding/breeding.

Ambystoma opacum

Kaplan and Crump. 8(3) supplement: 11. brooding energetics (abstr.).

Ambystoma texanum

Hirschfeld. 8(1): 28. photo.
Plummer. 8(3): 79-80. breeding migrations.
Moll, et al. 8(3): 85. range.

Ambystoma tigrinum

chambers. 8(3) supplement: 4. energetics in life stages (abstr.).

Ambystoma tigrinum mavortium

Black and Collins. 8(1): 5. albino.

Ambystoma tremblayi

Briggs. 8(1): 13. range.

Ameiva polops

USDI. 8(1): 10. proposed Endangered status.
USDI. 8(2): 38. final status announced.

Ameiva wetmorei

Thomas and Thomas. 8(2): 40. range.

Amphibia

Baez. 8(3) supplement: 1-2. zoogeography in South America (abstr.).
Duellman. 8(3) supplement: 7. evolution and zoogeography--Andes (abstr.).
Echternacht. 8(3) supplement: 8. zoogeography--West Indies (abstr.).
Gallardo. 8(3) supplement: 8-9. zoogeography--Chacoan (abstr.).
Hoogmoed. 8(3) supplement: 10. fauna in Guiana (abstr.).
Laurent. 8(3) supplement: 11-12. trans-Atlantic relationships (abstr.).
Lynch. 8(3) supplement: 12-13. faunal composition--rowland South America (abstr.).
Nelson. 8(3) supplement: 14. species composition--Indiana ponds (abstr.).
Pefaur and Duellman. 8(3) supplement: 14. Andean communities (abstr.).
Shine and Bull. 8(3) supplement: 16-17. reproductive frequencies (abstr.).
Stewart and Rossi. 8(3) supplement: 17. species in Albany Pine Bush (abstr.).

Aneides aeneus

Cupp. 8(3) supplement: 5. aggressive behavior (abstr.).

Anolis

Duellman. 8(2): 31. research at KU.
Moody. 8(3): 89. dispersal analogous to Draco's.
Fitch and Fitch. 8(3) supplement: 8. dewlaps (abstr.).
Gorman. 8(3) supplement: 9. statistical variation of electrophoresis analyses (abstr.).

Anolis carolinensis

Ringler. 8(2): 39. range.
Groves and Altimari. 8(4): 124. fed to Uromacer.

Anolis limifrons

Andrews, et al. 8(3) supplement: 1. demographics (abstr.).

Anolis occultus

Thomas and Thomas. 8(2): 40. range.

Anolis porcatus

Haneline. 8(2): 39. range.

Anolis roosevelti

USDI. 8(1): 10. proposed Endangered status.
USDI. 8(2): 38. final status announced.
USDI. 8(4): 130. final status and critical habitat stated.

Anolis sagrei

Meylan. 8(2): 39. range.
Corwin, et al. 8(3): 84. range.

Anolis taylori

Mautz. 8(3) supplement: 13. use of caves (abstr.).

Anura

Crump. 8(3) supplement: 5. reproductive ecology and communities (abstr.).
Duellman. 8(3) supplement: 6. acoustical niches (abstr.).
Durant. 8(3) supplement: 7. ecological distribution --Merida Andes (abstr.).
Formas. 8(3) supplement: 8. endemics in Nothofagus forest--Chile (abstr.).
Hadl. 8(3) supplement: 10. acoustic behavior (abstr.).
Nelson. 8(3) supplement: 14. community analysis (abstr.).
Toft. 8(3) supplement: 18. food utilization (abstr.).
Tyler. 8(3) supplement: 18-19. zoogeography--Australia (abstr.).
Wiest. 8(3) supplement: 20. succession in temporary Texas ponds (abstr.).

Arizona elegans elegans

Soltesz. 8(1): 13. range.

Atelopus oxyrhynchus

Durant and Dole. 8(3) supplement: 7. ecology (abstr.).

Atractaspis bibronii

Greene. 8(3) supplement: 9. behavior, ecology (abstr.).

Atractaspis microlepidota

Greene. 8(3) supplement: 9. ecology, behavior (abstr.).

Atractus occipitoalbus

de Espinoza. 8(3) supplement: 3. range (abstr.).

Batrachoseps

Wake and Hanken. 8(3): 75. research at Univ. California-Berkeley.

Bipes

Wake and Hanken. 8(3): 74. research at Univ. California-Berkeley.

Boa constrictor

Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Bufo

Wake and Hanken. 8(3): 75. research at Univ. California-Berkeley.

Bufo americanus

Hoff. 8(2): 33. hibernaculum.
Branham and List. 8(3) supplement: 2-3. urostyle development (abstr.).

Bufo atacamensis

Veloso and Penna. 8(3) supplement: 19. calls (abstr.).

Bufo boreas

Pettus and Woolley. 8(3) supplement: 14. skin surface sculpturing (abstr.).

Bufo chilensis

Veloso and Penna. 8(3) supplement: 19. calls (abstr.).

Bufo granulosus

Acuna and Rodulfo. 8(3) supplement: 1. hematology (abstr.).
Gorzula. 8(3) supplement: 9. food of Caiman crocodilus (abstr.).

Bufo lemur

Thomas and Thomas. 8(2): 40. range.

Bufo vercicus

Lawler. 8(3): 76-79. commensal with gopher tortoises.

Bufo spinulosus

Veloso and Penna. 8(3) supplement: 19. calls (abstr.).

Bufo terrestris

Ringler. 8(2): 39. range.
Lawler. 8(3): 76-79. commensal with gopher tortoises.
Pettus and Woolley. 8(3) supplement: 14. skin surface sculpturing (abstr.).

Bufo viridis

Werner. 8(3) supplement: 20. range (abstr.).

Bufo woodhousei

Pettus and Woolley. 8(3) supplement: 14. skin surface sculpturing (abstr.).

Bufo woodhousei fowleri

Vance and Taplin 8(1): 4-5. yellow albino specimen.

Caiman c. crocodilus

Gorzula. 8(3) supplement: 9. ecology in Venezuelan Guayana (abstr.).

Caretta c. caretta

Ringler. 8(2): 39. range.

Caudata

Edwards. 8(3) supplement: 8. gait analysis (abstr.).

Cemophora coccinea copei

Ringler. 8(2): 39. range.

Centrolenella fleischmanni

Schwalm and McNulty. 8(3) supplement: 16. chromatophore ultrastructure (abstr.).

Chelonia

Earnhart and Smith. 8(3) supplement: 7-8. comparative thermoregulation (abstr.).
Schleich. 8(4): 126-129. distribution in Iran.

Chelonia mydas

Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Chelydra serpentina

Trauth. 8(2): 33. embryonic hibernation.
Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Chelydridae

Whetstone. 8(3) supplement: 20. fossil relationships (abstr.).

Chiromantis petersi

Drewes, et al. 8(3): supplement: 6. integument and uricotely (abstr.).

Chiromantis xerampelina

Drewes, et al. 8(3) supplement: 6. integument and unicotely (abstr.).

Chironius cinnamomeus

de Espinoza. 8(3) supplement: 3. range (abstr.).

Chironius flavolineatus

de Espinoza. 8(3) supplement: 3. range (abstr.).

Chironius laevicolis

de Espinoza. 8(3) supplement: 3. range (abstr.).

Chironius monticola

de Espinoza. 8(3) supplement: 3. range (abstr.).

Chondropython viridis

Gray. 8(4): 148. photo of cannibalism.

Chrysemys floridana

Jackson. 8(3): 89. reproductive strategy (abstr.).

Chrysemys nelsoni

Powers. 8(3): 84. range.
Jackson. 8(3): 89. reproductive strategy (abstr.).

Chrysemys picta

Trauth. 8(2): 33. embryonic hibernation.
Tracy, et al. 8(3) supplement: 18. egg water exchange (abstr.).

Chrysemys picta belli

Miller. 8(3): 112. photo.

Chrysemys scripta

Ringler. 8(2): 39. range.
Jackson. 8(3): 89. reproductive strategy (abstr.).
Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Chrysemys scripta elegans

Walley. 8(4): 125. range.

Clemmys

Bloomer. 8(3): 85. field studies.

Clemmys insculpta

Trauth. 8(2): 33. embryonic hibernation.
Harding. 8(2): 34. record egg clutches.

Clemmys muhlenbergi

Bloomer. 8(3): 85. field studies/habitat preservation.
Anon. 8(4): 131. research of Richard Holub.

Clonophis kirtlandi

Collins. 8(1): 28. photo.
Tucker, et al. 8(2): 40-41. range.

Cnemidophorus sexlineatus

Trauth. 8(2): 33. embryonic hibernation.
Ringler. 8(2): 39. range.
Trauth. 8(3) supplement: 18. collection (abstr.).

Cnemidophorus tigris

Creusere and Whitford. 8(3) supplement: 5. diel activity (abstr.).

Colostethus

Duellman. 8(2): 31. research at KU.
Durant. 8(3) supplement: 7. diversity in Merida Andes (abstr.).

Colostethus meridensis

Durant. 8(3) supplement: 7. habitat (abstr.).

Coluber constrictor

Hedges. 8(4): 125-126. variation in Florida Keys.

Coluber constrictor priapus

Ringler. 8(2): 39. range.

Cophosaurus texana

Creusere and Whitford. 8(3) supplement: 5. diel activity (abstr.).

Crocodilia

Schleich. 8(4): 126-129. distribution in Iran.

Crocodylus intermedius

Ramirez, et al. 8(4): 130. conservation in Venezuela.

Crocodylus palustris

Anon. 8(1): 10. conservation in India.

Crocodylus porosus

Anon. 8(1): 10. conservation in India.

Crotalus adamanteus

Greene. 8(1): 4. SSAR conservation resolution.
Ringler. 8(2): 39. range.
Lawler. 8(3): 76-79. commensal with gopher tortoises.

Crotalus cerostes

Lillywhite. 8(3) supplement: 12. tracking (abstr.).

Crotalus e. enyo

Tryon and Radcliffe. 8(2): 34-36. captive breeding (with photos).

Crotalus m. mitchelli

Tryon and Radcliffe. 8(2): 35. associates.

Crotalus ruber lucasensis

Tryon and Radcliffe. 8(2): 35. associates.

Crotalus r. ruber

Tryon and Radcliffe. 8(2): 35. associates.

Crotalus viridis

Lillywhite. 8(3) supplement: 12. tracking (abstr.).

Crotalus viridis helleri

Tryon and Radcliffe. 8(2): 35. associates.

Crotaphytus

Wake and Hanken. 8(3): 75. research at Univ. California-Berkeley.

Ctenosaura

Duellman. 8(2): 31. research at KU.

Ctenosaura pectinata

Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Cupriguanus achalensis

di Tada, et al. 8(3) supplement: 6. reproduction and feeding (abstr.).

Deirochelys reticularia

Jackson. 8(3): 89. reproductive strategy (abstr.).

Dendrobatidae

Bogart. 8(3) supplement: 2. evolution (abstr.).

Dermochelys coriacea

Ringler. 8(2): 39. range.

Desmognathus fuscus

Vance and Taplin. 8(1): 4. yellow albino specimen.
Juterbock. 8(3) supplement: 11. taxonomy cf. D. welteri (abstr.).
Tyning. 8(4): 118. yellow albino specimen.

Desmognathus monticola

Juterbock. 8(3) supplement: 11. taxonomy cf. D. welteri (abstr.).

Desmognathus welteri

Juterbock. 8(3) supplement: 11. taxonomy (abstr.).

Diadophis punctatus

Fitch. 8(3) supplement: 8. density in Kansas (abstr.).

Dinodon rufozonatum

Simmons. 8(2): 32. captive breeding.

Diploglossus pleei

Thomas and Thomas 8(2): 40. range.

Dipsas indica ecuadorensis

de Espinoza. 8(3) supplement: 3. range (abstr.).

Discoglossus pictus

Busack. 8(4): 147. photo.

Dryadophis danieli

de Espinoza. 8(3) supplement: 3. range (abstr.).

Drymarchon corais couperi

Greene. 8(1): 3-4. SSAR conservation resolution.
Lawler. 8(3): 76-79. population status in SE United States and pesticide uptake.
USDI. 8(3): 89. proposed Threatened status.
USDI. 8(4): 130-131. final status.

Drymarchon corais melanurus

de Espinoza. 8(3) supplement: 3. range (abstr.).

Drymobius chloroticus

de Espinoza. 8(3) supplement: 3. range (abstr.).

Elanchistocleis ovalis

Gorzula. 8(3) supplement: 9. food of Caiman crocodilus (abstr.).

Elaphe

Lawler. 8(3): 76-79. commensal with gopher tortoises.

Elaphe guttata

Fitch. 8(3) supplement: 8. density in Kansas (abstr.).

Elaphe obsoleta

Trauth. 8(2): 33. embryonic cold survival.
Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Elaphe subocularis

Anon. 8(1): 15. erratum in HR 7(4).
Tryon. 8(4): 148. photo (hatchling and parent).

Eleutherodactylus williamsi

Durant. 8(3) supplement: 7. habitat (abstr.).

Emydinae

Whetstone. 8(3) supplement: 20. fossil relationships (abstr.).

Emydoidea blandingi

Walley. 8(4): 125. range.

Enyalius

Jackson. 8(3) supplement: 10. evolution (abstr.).

Eumeces egregius

Smith. 8(3) supplement: 17. resource partitioning (abstr.).

Eumeces fasciatus

Vance and Taplin. 8(1): 5. albino.
Trauth. 8(2): 33. embryonic cold survival.

Eumeces inexpectatus

Ringler. 8(2): 39. range.

Eurycea junaluska

Sever. 8(2): 32. paratypes.

Eurycea longicauda melanopleura

McDaniel and Saugey. 8(2): 38. associates.

Eurycea lucifuga

McDaniel and Saugey. 8(2): 38. associates.

Eurycea quadridigitata

Ringler. 8(2): 39. range.

Farancia

Rossman and Cundall. 8(3) supplement: 15-16. relations to Pseudoeryx plicatilis (abstr.).

Gastrophryne carolinensis

Ringler.8(2): 39. range.

Gastrotheca

Duellman. 8(2): 31. research at KU.

Gavialis gangeticus

Anon. 8(1): 10. conservation in India.

Geochelone radiata

Anon. 8(1): 15. breeding at NY Zoological Park.

Geochelone yniphora

Anon. 8(1): 15. breeding at NY Zoological Park.

Gerrhonotus coeruleus

Otvos. 8(1): 6-7. habitat associates and food.

Gopherus polyphemus

Lawler. 8(3): 76-79. commensals.

Graptemys geographica

Kiviat and Buso. 8(3): 84. range.

Gymnophthalmus rubricaudus

Hulse. 8(2): 40. range.

Gyrinophilus porphyriticus

Anon. 8(2): 42. erratum in HR 7(3).

Hemidactylus turcicus

Meylan. 8(2): 39. range.

Heterodon nasicus gloydi

Anon. 8(2): 42. erratum in HR 7(3).

Heterodon platyrhinos

Walley. 8(4): 125. range.

Homonota horrida

Hulse. 8(2): 40. range.

Homonota underwoodi

Hulse. 8(2): 40. range.

Hydromantes

Wake, et al. 8(3) supplement: 19. albumin evolution and biogeography (abstr.).

Hyla

Durant. 8(3) supplement: 7. diversity in Merida Andes (abstr.).

Hyla boans

Hodl. 8(3) supplement: 10. distress call (abstr.).

Hyla chrysocelis

Ralin, et al. 8(3) supplement: 15. multivariate approach to species-complex (abstr.).

Hyla crepitans

Acuna. 8(3) supplement: 1. cytomorphology (abstr.).
Acuna and Rodulfo. 8(3) supplement: 1. hematology (abstr.).
Durant. 8(3) supplement: 7. distribution (abstr.).

Hyla crucifer

Busack. 8(1): 13. range.

Hyla geographica

Acuna. 8(3) supplement: 1. cytomorphology (abstr.).
Acuna and Rodulfo. 8(3) supplement: 1. hematology (abstr.).

Hyla lanciformis

Hodl. 8(3) supplement: 10. distress call (abstr.).

Hyla rostrata

Acuna. 8(3) supplement: 1. cytomorphology (abstr.).

Hyla robertsimoni

Acuna. 8(3) supplement: 1. cytomorphology (abstr.).

Hyla squirella

Ringler. 8(2): 39. range.

Hyla versicolor

Branham and List. 8(3) supplement: 2-3. development of urostyle (abstr.).
Ralin, et al. 8(3) supplement: 15. multivariate approach to species-complex (abstr.).

Hyla x-signata

Acuna. 8(3) supplement: 1. cytomorphology (abstr.).
Acuna and Rodulfo. 8(3) supplement: 1. hematology (abstr.).

Hylidae

Schwalm and McNulty. 8(3) supplement: 16. chromatophore ultrastructure (abstr.).

Hypsiglena torquata deserticola

Mullen. 8(3): 84. range.

Iguana

Duellman. 8(2): 31. research at KU.

Iguana iguana

Garber. 8(1): 13. range.
Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Lacerta muralis

Vigle. 8(3) supplement: 19. status of introduced population in U.S. (abstr.).

Lampropeltis c. calligaster

Moll, et al. 8(3): 85. range.

Lampropeltis getulus getulus

Ringler. 8(2): 39. range.

Lampropeltis getulus holbrooki

Kappel. 8(3): 84-85. range.

Lampropeltis m. mexicana

Liner and Dundee. 8(3): 85. range.

Lampropeltis triangulum elapsoides

Hedges. 8(4): 125-126. range.

Lampropeltis triangulum nelsoni

Anon. 8(1): 15. erratum in HR 7(4).

Leimadophis fraseri

de Espinoza. 8(3) supplement: 3. range (abstr.).

Leimadophis melanostigma

de Espinoza. 8(3) supplement: 3. range (abstr.).

Leimadophis oligolepis

de Espinoza. 8(3) supplement: 3. range (abstr.).

Leimadophis triscalis

de Espinoza. 8(3) supplement: 3. range (abstr.).

Leimadophis typhlus forsteri

de Espinoza. 8(3) supplement: 3. range (abstr.).

Lepidochelys olivacea

Bartlett. 8(3) supplement: 2. blood phosphate (abstr.).

Lepidophyma smithi

Mautz. 8(3) supplement: 13. use of caves (abstr.).

Leptodactylus

Durant. 8(3) supplement: 7. diversity in Merida Andes (abstr.).

Leptodactylus fuscus

Acuna and Rodulfo. 8(3) supplement: 1. hematology (abstr.).

Leptodactylus ocellatus

Hodl. 8(3) supplement: 10. distress call (abstr.).

Leptodactylus pentadactylus

Hodl. 8(3) supplement: 10. distress call (abstr.).

Leptodactylus podicipinus

Durant. 8(3) supplement: 7. distribution in Merida Andes (abstr.).

Leptodeira

Duellman. 8(2): 32. research at KU.

Leptotyphlops borrichianus

Hulse. 8(2): 40. range.

Leptotyphlops melanotermus

Hulse. 8(2): 40. range.

Leptotyphlops uniguirostris

Hulse. 8(2): 40. range.

Limnaoedus ocularis

Ringler. 8(2): 39. range.

Liolaemus

Cei. 8(3) supplement: 4. speciation in Patagonia (abstr.).

Lissemys p. punctata

Duda and Gupta. 8(3): 75-76. gonadal atrophy.
Duda and Gupta. 8(4): 119-120. kyphotic specimen.

Manculus quadridigitatus

Anon. 8(2): 42. erratum in HR 7(3).

Masticophis f. flagellum

Lawler. 8(3): 76-69. commensal with gopher tortoises.

Masticophis taeniatus taeniatus

Holland. 8(1): 13. range.

Natrix cyclopion cyclopion

Cooper. 8(1): 13-14. range/variation.

Natrix cyclopion floridana

Cooper. 8(1): 13-14. range/variation.

Natrix fasciata

Kochman. 8(3) supplement: 11. differentiation/hybridization (abstr.).
Osgood. 8(3) supplement: 14. temperature induced anomalies (abstr.).

Natrix sipedon

Weil and Aldridge. 8(3) supplement: 19-20. temperature and male reproductive cycle (abstr.).

Necturus maculosus

Miller. 8(3) supplement: 13. activity metabolism (abstr.).

Neoseps reynoldsi

Smith. 8(3) supplement: 17. resource partitioning (abstr.).

Notophthalmus

Huheey and Brandon. 8(3) supplement: 10. skin toxins (abstr.).

Notophthalmus viridescens louisianensis

Johnson. 8(3): 112. photo.
Walley. 8(4): 125. range.

Opheodrys aestivus

Ringler. 8(2): 39. range.

Opheodrys vernalis blanchardi

Walley. 8(4): 125. range.

Ophisaurus attenuatus

Duellman. 8(2): 31. research at KU.

Ophisaurus compressus

Meylan. 8(2): 39. rge.
Anon. 8(2): 42. erratum in HR 7(3).

Ophisaurus ventralis

Ringler. 8(2): 39. range.
Lawler. 8(3): 76-69. commensal with gopher tortoises.

Osteopilus septentrionalis

Myers. 8(2): 38. range.

Philodryas

Thomas. 8(3) supplement: 18. taxonomy (abstr.).

Phimophis vittatus

Hulse. 8(2): 40. range.

Phyllodactylus lanei

Mautz. 8(3) supplement: 13. use of caves (abstr.).

Phyllomedusa sauvagei

Drewes, et al. 8(3) supplement: 6. integument and unicotely (abstr.).

Pituophis melanoleucus mugitus

Lawler. 8(3): 76-69. commensal with gopher tortoises.

Platysternon

Whetstone. 8(3) supplement: 20. fossil relationships (abstr.).

Plethodon cinereus

Hoff. 8(2): 33. hibernaculum.

Plethodon dorsalis angusticlavius

McDaniel and Saugey. 8(2): 38. associates.

Plethodon glutinosus

McDaniel and Saugey. 8(2): 38. associates.
Ringler. 8(2): 39. range.

Plethodon yonahlossee

Ogle. 8(2): 38. range.

Pleurodema brachyops

Gorzula. 8(3) supplement: 9. food of Caiman crocodilus (abstr.).

Pleurodema nebulosa

Hulse. 8(2): 40. range.

Pseudacris ornata

Ashton and Ashton. 8(3) supplement: 1. natural history (abstr.).

Pseudacris triseriata

Branham and List. 8(3) supplement: 2-3. development of urostyle (abstr.).

Pseudemys

Duda and Gupta. 8(4): 119-120. kyphosis in.

Pseudemys (see also Chrysemys) scripta elegans

Moll, et al. 8(3): 85. range.

Pseudis paradoxa

Acuna and Rodulfo. 8(3) supplement: 1. hematology (abstr.).

Pseudoeryx plicitalis mimeticus

de Espinoza. 8(3) supplement: 3. range (abstr.).
Rossman and Cundall. 8(3) supplement: 15-16. relations to Farancia (abstr.).

Pseudotriton

Huheey and Brandon. 8(3) supplement: 10. skin toxin (abstr.).

Pseudotriton montanus diastictus

Brandon, et al. 8(3) supplement: 2. defense (abstr.).

Pseudotriton r. ruber

Brandon, et al. 8(3) supplement: 2. defense (abstr.).

Python reticulatus

Johnson. 8(4): 147. photo.

Rana areolata

Lawler. 8(3): 76-79. commensal with gopher tortoises.

Rana areolata circulosa

Plummer. 8(2): 38. range.

Rana blairi

Fitch. 8(3) supplement: 8. food resource for snakes (abstr.).

Rana catesbeiana

Phillips, et al. 8(3) supplement: 14-15. DNA inhibitors and metamorphosis (abstr.).
Williams, et al. 8(3) supplement: 20. thyroid hormone and liver development (abstr.).
Black. 8(4): 132. photo.

Rana palustris

Robison. 8(3): 84. range.

Rana pipiens (complex)

Bagnara and Frost. 8(4): 118-119. species confusion in commercial supplies.

Rana pipiens

Duellman. 8(2): 31. research at KU.
Wake and Hanken. 8(3): 75. research at Univ. California-Berkeley.
Branham and List. 8(3) supplement: 2-3. development of urostyle (abstr.).
Tarnowski. 8(3) supplement: 17-18. effects of chlorine on eggs (abstr.).

Rana sylvatica

Robison and Douglas. 8(1): 13. range.

Rana utricularia

Lawler. 8(3): 76-79. commensal with gopher tortoises.

Regina alleni

Anon. 8(2): 42. errata in HR 7(2).

Regina grahami

Walley. 8(2): 39. range.

Regina septemvittata

Butler. 8(3) supplement: 3. feeding at low temperatures (abstr.).

Reptilia

Baez. 8(3) supplement: 1-2. zoogeography in South America (abstr.).
Dixon. 8(3) supplement: 6. zoogeography--South American rainforests.
Duellman. 8(3) supplement: 7. evolution and zoogeography--Andes (abstr.).
Echternacht. 8(3) supplement: 8. zoogeography--West Indies (abstr.).
Gallardo. 8(3) supplement: 8-9. zoogeography--Chacoan (abstr.).
Hoogmoed. 8(3) supplement: 10. fauna in Guiana (abstr.).
Laurent. 8(3) supplement: 11-12. trans-Atlantic relationships (abstr.).
Pefaur and Duellman. 8(3) supplement: 14. Andean communities (abstr.).
Shine and Bull. 8(3) supplement: 16-17. reproductive frequencies (abstr.).
Stewart and Rossi. 8(3) supplement: 17. species in Albany Pine Bush (abstr.).
Tyler. 8(3) supplement: 18-19. zoogeography--Australia (abstr.).
Werner 8(3) supplement: 20. taxa of Sinai Peninsula (abstr.).

Rhinobothryum bovalli

Tryon. 8(1): 15. kept at Fort Worth Zoo.

Sauria

Schleich. 8(4): 126-129. distribution in Iran.

Scaphiopus

Ashton and Ashton. 8(3) supplement: 1. burrowing cf. Pseudacris ornata (abstr.).

Scaphiopus bombifrons

Sattler and Mecham. 8(3) supplement: 16. hybridization with S. hammondi (abstr.).

Schaphiopus hammondi

Sattler and Mecham. 8(3) supplement: 16. hybridization with S. bombifrons (abstr.).

Scaphiopus holbrooki hurteri

Plummer. 8(2): 39. range.

Sceloporus graciosus

Otvos. 8(1): 6-7. habitat associates and food.

Sceloporus jarrovi

Middendorf and Post. 8(3) supplement: 13. social structure (abstr.).

Sceloporus occidentalis

Otvos. 8(1): 6-7. habitat associates and food.

Sceloporus undulatus tristichus

Otvos. 8(1): 6-7. food.

Scincella lateralis

Ringler. 8(2): 39. range.

Seminatrix pygea paludis

Anon. 8(2): 42. erratum in HR 7(3).

Serpentes

Reynolds. 8(3) supplement: 15. partitioning of mammalian food resource (abstr.).
Savitzky. 8(3) supplement: 16. venom delivery systems. (abstr.).
Schleich. 8(4): 126-129. distribution in Iran.

Sibon nebulata leucomelas

de Espinoza. 8(3) supplement: 3. range (abstr.).

Sistrurus miliarius streckeri

Paukstis. 8(1): 14. range.

Sphaerodactylus klauberi

Thomas and Thomas. 8(2): 40. range.

Sphenodon punctatus

Trauth. 8(2): 33. embryonic hibernation.

Squamata

Packard, et al. 8(3) supplement: 14. egg ultrastructure (abstr.).

Sternotherus odoratus

Moll, et al. 8(3): 85. range.

Storeria dekayi

Hedges. 8(4): 125-126. variation in Florida Keys.

Storeria dekayi texana

Anon. 8(2): 42. erratum in HR 7(3).

Strobilurus torquatus

Jackson. 8(3) supplement: 10-11. evolution (abstr.).

Tantilla nigriceps fumiceps

Liner and Dundee. 8(3): 85. range.

Tantilla n. nigriceps

Soltesz and Holmes. 8(1): 14. range.

Tantilla relicta

Smith. 8(3) supplement: 17. resource partitioning (abstr.).

Taricha

Huheey and Brandon. 8(3) supplement: 10. skin toxin (abstr.).

Telmatobius

Duellman. 8(2): 31. research at KU.

Thamnodynastes

Hulse. 8(2): 40. range.

Thamnodynastes strigilis

Hulse. 8(2): 40. range.

Thamnophis elegans vagrans

Scott. 8(3) supplement: 16. seasonal temperature preferenda (abstr.).

Thamnophis melanogaster

Ford and Ball. 8(4): 118. clutch size and young.

Thamnophis proximus

de Espinoza. 8(3) supplement: 3. range (abstr.).

Thamnophis radix haydeni

Anon. 8(2): 42. erratum in HR 7(3).

Thamnophis sauritus sackeni

Ringler. 8(2): 39. range.

Thamnophis s. sirtalis

Ringler. 8(2): 39. range.
Denny, et al. 8(3) supplement: 5. tongue removal effects feeding (abstr.).

Thorius

Wake and Hanken. 8(3): 75. research at Univ. California-Berkeley.

Trionyx

Duda and Gupta. 8(4): 119-120. kyphosis in.

Trionyx muticus

Plummer. 8(3) supplement: 15. ecology (abstr.).

Tropidoclonion lineatum

Soltesz. 8(1): 14. range.
Anon. 8(2): 42. erratum in HR 7(3).

Uromacer oxyrhynchus

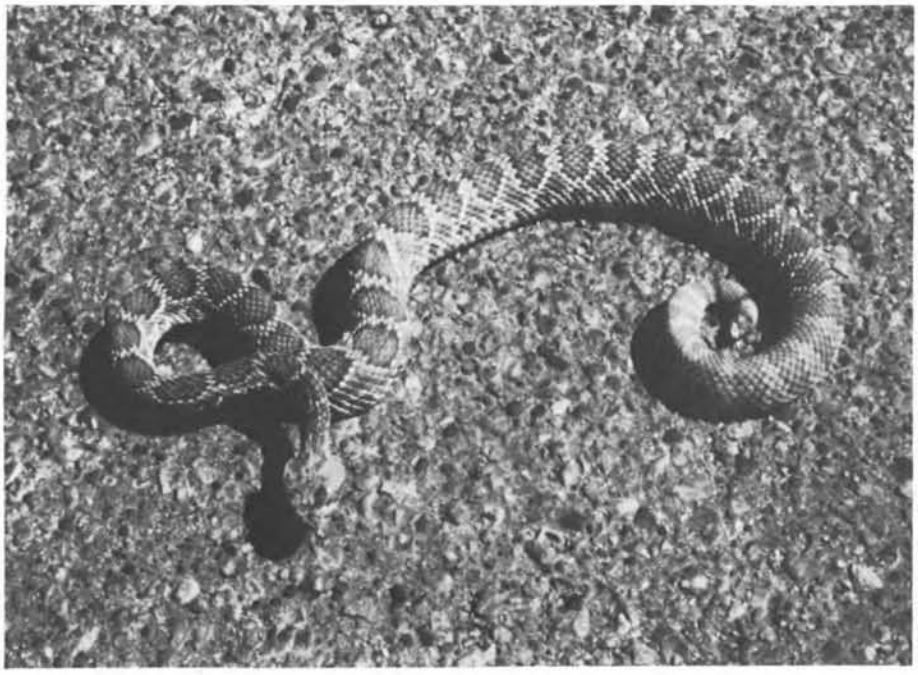
Groves and Altimari. 8(4): 124. keratophagy.

Xenodon merremii

de Espinoza. 8(3) supplement: 3. range (abstr.).

Xenopus laevus

Branham and List. 8(3) supplement: 2-3. development of urostyle (abstr.).



brate Collection (USAO 73). First record for country and extends range 21 km NE of nearest known locality in Comanche Co. (Webb, 1970, Reptiles of Oklahoma, Univ. Okla. Press).

Submitted by CHARLES M. MATHER, Department of Science and Mathematics, University of Science and Arts of Oklahoma, Chickasha, Oklahoma 73018.

Texas Amphibians and Reptiles: Some New Distributional Records, Part 1

The following records add to the distributional data of some species of reptiles and amphibians in Texas. These range extensions and new county records supplement those of Raun and Gehlbach (1972), Lewis (1974), Burr and Morris (1975), Hambrick (1975, 1976), Merkord (1975), Cys (1976), and Mather and Dixon (1976). Unless discussed as a range extension or a range-margin extension, specimens are exclusively new county records for the given counties. All specimens are deposited in the Texas A&I Collections, Texas A&I University. Parenthetical numbers refer to the number of individual specimens entered as a series with the same catalogue number. All identifications and verifications were made by Dr. Allan H. Chaney and the author. Nomenclature follows Conant (1975) and Collins, et al. (1978).

CAUDATA

Ambystoma tigrinum mavortium (Barred Tiger Salamander): STARR Co. TAIC-4115(14). San Isidro. May 1976. A. Ortiz. This series of specimens extends the range-margin westward in extreme south Texas from Brooks and Hidalgo counties. VAL VERDE Co. TAIC-3667(7). Bed Rock Crossing of the Pecos River, 40.2 km N Langtry. 14 April 1974. A. Chaney, et al. These specimens were introduced to this locality by sport fishermen, using the salamanders as bait; some specimens have hook-inflicted wounds on the dorsal surface of the neck. Tiger salamanders are often available at local bait stands (A. H. Chaney, pers. comm.).

Notophthalmus meridionalis meridionalis (Black-spotted Newt): NUECES Co. TAIC-3827(1). Banquete. 12 April 1975. D. McCarty.

Plethodon glutinosus glutinosus (Slimy Salamander): UVALDE Co. TAIC-1786(3). 32 km NW Uvalde on FM rd. 1051. 1 March 1969. J. Rickner, et al. This record is a range-margin extension along the Balcones Escarpment, from adjacent Real and Bandera counties.

SALIENTIA

Bufo punctatus (Red-spotted Toad): BRISCOE Co. TAIC-1650(2). 16.1 km WSW Quitaque. 4 September 1968. K. Matocha and B. Chapman.

Hypopachus variolosus (Sheep Frog): KENEDY Co. TAIC-4106(1). 30.3 km S Sarita on U.S. 77. 12 June 1977. R. Schmidt and J. Karges.

Rana catesbeiana (Bullfrog): WILLACY Co. TAIC-4114(3). 20.6 km W Raymondville o Texas 186. 12 June 1977. J. Karges and R. Schmidt. These three specimens are a range extension southward of 88 km, from the nearest county record, Kleberg Co.

TESTUDINES

Chelydra serpentina serpentina (Common Snapping Turtle): LAMPASAS Co. TAIC-2017(1). 12.8 km N Adamsville on U.S. 281. 24 August 1969. V. McDaniel and K. Matocha. MATAGORDA Co. TAIC-3621(1). 12.8 km SE Bay City. 29 March 1974. A. Chaney, et al. WALLER Co. TAIC-703(1). 8 km NW Katy. Spring, 1967. W. Kretz.

Kinosternon subrubrum hippocrepis (Mississippi Mud Turtle): COMAL Co. TAIC-2422(1). Landa Park, New Braunfels. 25 April 1971. J. Kreuz, et al. This specimen represents a range-margin extension to the west from adjacent Hays Co.

Sternothaerus odoratus (Stinkpot): BLANCO Co. TAIC-372(3). Blanco River, Blanco. 20 November 1966. A. Chaney, et al.

SAURIA

COLEONYX BREVIS (Texas Banded Gecko): DUVAL Co. TAIC-3880(1). 7.2 km S Freer on Texas 339. 29 February 1976. R. Schmidt and J. Karges. TAIC-4022(1). 10.6 km S Freer on Texas 339. 25 July 1976. J. Karges and R. Schmidt. These two specimens partially bridge the area between an isolated Kleberg Co. record and records for Webb county.

Eumeces tetragrammus brevilineatus (Short-lined Skink): LA SALLE Co. TAIC-643(1). 16.1 km SE Cotulla on FM rd. 468. 9 April 1967. A. Chaney, et al. MAVERICK Co. TAIC-2473(2). 17.7 km ESE Eagle Pass on U.S. 277. 23 April 1971. A. Chaney, et al. Eumeces tetragrammus tetragrammus (Four-lined Skink): STARR Co. TAIC-2931(1). 3.2 km W Rio Grande City. 10 March 1972. P. Villareal. The Starr county specimen is a range-margin extension west of adjacent Hidalgo county. WILLACY Co. TAIC-2748(1). Raymondville. 23 January 1972. A. Ortiz. TAIC-3206(1). San Perlita. 18 April 1972. T. Blasienz. TAIC-3207(1). San Perlita. 15 April 1972. C. Montez and R. Sanderval.

Ophisaurus attenuatus attenuatus (Western Slender Glass Lizard): JIM WELLS Co. TAIC-2823(1). Alice. 5 March 1972. I. Nava. This specimen is a range-margin extension west from Kleberg and Nueces counties. KENEDY Co. TAIC-508(1). 12.8 km S Sarita on U.S. 77. 7 October 1969. J. Rickner and M. Simons. The Kenedy county specimen is a link in the distribution gap between extreme southern Texas and northern populations.

Phrynosoma cornutum (Texas Horned Lizard): WILLACY Co. TAIC-3208(1). 1.2 km S San Perlita. 28 April 1972. R. Guzman.

Sceloporus variabilis marmoratus (Rosebelly Lizard): DIMMITT Co. TAIC-3661(1). Asherton. 13 April 1974. A. Chaney, et al.

SERPENTES

Coniophanes imperialis imperialis (Black-striped Snake): WILLACY Co. TAIC-3203(1). San Perlita. 15 May 1972. S. Llanes. TAIC-3384(1). 15.6 km WSW Raymondville on FM rd. 490. 27 April 1973. J. Richner. These two specimens are range-margin extensions northeastward from adjacent Cameron and Hildalgo counties.

Crotalus horridus (Timber Rattlesnake): MATAGORDA Co. TAIC-3955(2). 8 km N Bay City. 3 April 1976. A. Chaney, et al. WHARTON Co. TAIC-11(1). 9.6 km W Wharton on FM rd. 961. 2 June 1969. L. Orgak and M. Simons.

Drymarchon corais erebennus (Texas Indigo Snake): BROOKS Co. TAIC-846(1). S Falfurrias on U.S. 281. 13 August 1976. J. Tunnell. NUECES Co. TAIC-689(1). Bishop. 10 May 1967. M. Johnson.

Elaphe guttata emoryi (Great Plains Rat Snake): GOLIAD Co. TAIC-1753(2). 3.2 km S Goliad. 10 February 1969. J. Davis and S. Davis. TAIC-3941(1). 8 km N. Goliad. 22 May 1976. J. Karges. JIM HOGG Co. TAIC 3561(1). 4.8 km E Randado on Texas 16. 13 March 1970. R. Leal. KERR Co. TAIC-3290(1). 20.9 km S Kerrville. 28 October 1972. A. Chaney. MATAGORDA Co. TAIC-3413(1). 7.6 km NE Wadsworth on FM rd. 521. 14 April 1973. A. Chaney, et al. McMULLEN Co. TAIC-1362(1). 49.6 km S Tilden on FM rd. 624. 17 October 1969. C. Huckabee. WEBB Co. TAIC-732(1), TAIC-734(1), TAIC-1147(1), TAIC-1150(1), TAIC-1181(1), TAIC-1215(1), TAIC-2357(1). The eight specimens listed above are from several localities within the county; they confirm the existence of Elaphe guttata emoryi in Webb County as recorded by Williams, et al. (1961) and omitted by Raun and Gehlbach (1972).

Ficimia streckeri (Mexican Hooknose Snake): WILLACY Co. TAIC-4109 (1). 14.6 km W Raymondville on Texas 186. 12 June 1977. J. Karges and R. Schmidt. The specimen is a range-margin extension northeastward from Cameron Co.

Heterodon platyrhinos (Eastern Hognose Snake). LAVACA Co. TAIC-3303(1). 14.5 km N Yorktown on FM rd. 531. 10 March 1973. D. Merian. NUECES Co. TAIC-890(1). Calallen. 25 May 1960. B. Konze. TAIC-3980 (1). Port Aransas. 20 May 1976. S. Rabalais and N. Rabalais. WALLER Co. TAIC-696(1). 11.3 km N Katy. Spring, 1967. W. Kretz. WHARTON Co. TAIC-156(1). 11.6 km SE Bay City. 1 July 1969. M. Simons.

Lampropeltis calligaster calligaster (Prairie Kingsnake): NUECES Co. TAIC-665(1). S Bishop. 17 April 1967. M. Neil. This specimen is a range-margin extension southeastward from adjacent San Patricio Co. REFUGIO Co. TAIC-2680(1). 4.8 km E Refugio on FM rd. 774. 10 November 1971. T. Edwards. TAIC-4011(1). 8.5 km E Refugio on FM rd. 774. 31 July 1976. TAIC-4013(1). 12 km E Refugio on FM rd. 774. 31 July 1976. Both TAIC-4011 and TAIC-4013 were collected by R. Schmidt and J. Karges.

Lampropeltis getulus splendida (Desert Kingsnake): WEBB Co. TAIC-695(1). 16.1 km W Encinal on Texas 44. 20 April 1967. A. Chaney, et al.

Lampropeltis triangulum annulata (Mexican Milk Snake): KLEBERG Co. TAIC-278(1), TAIC-686(1), TAIC-669(1), TAIC-700(1), TAIC-790(1), TAIC-1563(1), TAIC-3788(1). The seven specimens are from several localities in Kleberg County, by several collectors.

Masticophis taeniatus schotti (Schott's Whipsnake): DUVAL Co. TAIC-2355(1). 1.6 km W Freer on Texas 59. 22 April 1971. A Chaney, et al. TAIC-3328(2). 6.9 km E Benavides on FM rd. 2295. 14 March 1973. A. Chaney, et al. Masticophis taeniatus ruthveni (Ruthven's Whipsnake). WILLACY Co. TAIC-4072(1). 8 km W Port Mansfield on Texas 186. March, 1977. A. Ortiz.

Nerodia rhombifera rhombifera (Diamondback Water Snake). KENEDY Co. TAIC-4108(1). 27 km S Sarita on U.S. 77. 12 June 1977. J. Karges and R. Schmidt.

Opheodrys aestivus (Rough Green Snake): DEWITT Co. TAIC-3643(1). Yorktown. 5 April 1974. S. Gallager.

Pituophis melanoleucus sayi (Bullsnake): DIMMITT Co. TAIC-4076(1). 12.8 km SE Catarina on U.S. 83. 22 April 1977. A. Chaney. JIM HOGG Co. TAIC-1368(1). 2.9 km NE Hebbronville on Texas 359. 10 October 1969. B. Allex, et al. MAVERICK Co. TAIC-1849(1). 32.8 km E Eagle Pass on U.S. 277. 19 April 1964. A. Chaney, et al. McMULLEN Co. TAIC-328(3), TAIC-1349(1), TAIC-1635(2), TAIC-3291(1). The seven bullsnakes were obtained from four localities in McMullen Co.

Regina rigida sinicola (Gulf Crayfish Snake): MATAGORDA Co. TAIC-3414(1). 14.7 km SE Bay City on FM rd. 2540. 14 April 1973. A. Chaney, et al. This record is an extension of the range of Regina rigida approximately 83 km to the southwest of the nearest county record, Galveston Co.

Rhinocheilus lecontei tessellatus (Texas Longnose Snake): ECTOR Co. TAIC-3526(1). Notrees. 22 July 1973. J. Rickner. McMULLEN Co. TAIC-1606(1). 30.4 km N Freer on Texas 16. 22 September 1968. J. Rickner and R. Tinnin.

Storeria dekayi texana (Texas Brown Snake): BROOKS Co. TAIC-296 (1). 0.8 km E Falfurrias on Texas 285. 20 April 1966. R. Zimmerman, et al. TAIC-1134(1). 11.3 km E Falfurrias on Texas 285. 9 October 1969. S. McMurry, et al. CALHOUN Co. TAIC-2867(1). 5.5 km N. Tivoli on Texas 35. 16 March 1972. A. Chaney, et al. TAIC-3338(1). 33.8 km NE Refugio on Texas 35. 12 April 1973. A. Chaney, et al. JACKSON Co. TAIC 3936(1). 8 km N Ganado. 16 May 1976. R. Schmidt and J. Karges. JIM WELLS Co. TAIC-2824(1). Alice. 5 March 1972. I. Nava. KIMBLE Co. TAIC-3187(1). Near Junction. 16 April 1972. A. Chaney, et al. WILLACY Co. TAIC-617(1). 5.8 km N Raymondville on U.S. 77. 1 March 1967. D. Mahoney. TAIC-2797(1). 2.1 km N Raymondville on U.S. 77. 20 February 1972. Texas A&I University herpetology class. TAIC-2889(1). 1.4 km S Kenedy Co./Willacy Co. border, on U.S. 77. 14 March 1972. Texas A&I University herpetology class.

Tropidoclonion lineatus texanum (Texas Lined Snake): CORYELL Co. TAIC-3983(1). Fort Hood Army Base. 18 June 1976. T. Edwards.

I express my gratitude to Dr. Allan H. Chaney for allowing me access to the Texas A&I Collections, and for offering suggestions. I also thank Mr. Richard R. Schmidt for participation in the field, and Mrs. Linda M. Scheck for typing the manuscript.

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News Notes

NEW GERMAN HERP BOOK

A new book, written in German, on snakes in captivity has just be released by Kosmos Franckh, Stuttgart. Entitled Schlangen im Terrarium and written by Werner Frank, this 64 page publication contains much valuable information about maintenance of snakes in captivity, and contains numerous, excellent color photographs. The book is dated 1978 and is available for DM 8.80 from: Franckh-Kosmos, Pfizerstrasse 5-7, 7000 Stuttgart 1, Germany.

NEW HERP DICTIONARY

A dictionary for the specialist in anatomy and herpetology, by George J. Jacobs, has been published by the Smithsonian Institution Press. This English-Russian: Russian-English dictionary is double columned, 9 x 10" and is 48 pages long (over 4600 Russian words) with a saddle stitched paper back for high readability and ease of use.

To purchase a copy, send $4.75 to Smithsonian Institution Press, Box 1579, Washington, D. C. 20560.

(Currently being reviewed for H.R.-ed.)

SSAR AWARD FOR BEST STUDENT JOURNAL PAPER

The Society for the Study of Amphibians and Reptiles awards an annual prize of $100 for the most significant student paper published in each volume of the Journal of Herpetology. Papers must be submitted to the Editor for publication within one year of the author's having been a student at an accredited school (elementary, secondary or university level). Unlike awards for oral presentations, which require the presence of the person at a particular meeting site in order to compete, this prize is open to students throughout the world. Papers are judged by a committee of five persons, international in composition. The Editor must be notified of the student status of the author when the paper is accepted for publication. The award is presented at the Society's Annual Meeting, and it is hoped that each year recipients will be present to accept the award.

THE THEODORE ROOSEVELT MEMORIAL FUND

The Theodore Roosevelt Memorial Fund provides financial assistance to individuals (especially graduate students and persons with recent graduate degrees) conducting research in North America on any phase of wildlife conservation or natural history related to the activities of the American Museum of Natural History. Grants are usually kept to small sums of not more than several hundred dollars. Most awards support field work, and funds are not made available for salaries or for the purchase of non-expendable equipment. Address requests for application forms and all correspondence to: Theodore Roosevelt Memorial Fund, The American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024. Deadline for applications is 15 February.

NEW TORTOISE VOLUME

Attention is called to a volume entitled Desert Tortoise Council -- Proceedings of 1977 Symposium. Thirteen contributed papers concern various facets of tortoise ecology, while the area reports generally involve tortoise conservation and habitat management. Together, they provide a wealth of information on the tortoise in its environs. Copies are available for $5.00 each from:

Desert Tortoise Council
1835 Klauber Avenue
San Diego, California 92114

Make checks payable to Desert Tortoise Council.

NEW CROCODILIAN BOOK

Bestimmen von Krokodilen und ihrer Haute, by Heinz Wermuth and Karlheinz Funchs. 1978. 100 pp. Soft cover. Available for DM 29 from: Gustav Fischer Verlag, D-7000 Stuttgart 72, Postfach 720143, Germany.

This compact, attractive little volume contains a checklist, key, and well-written species accounts of the crocodilians of the world. Each species account contains black-and-white illustrations and a range map. A must for crocodile-oriented biologists.

GECKO INFORMATION REQUESTED

Research on Coleonyx variegatus indicates that individuals select a certain site in which to defecate and return to this area on subsequent nights. I am trying to determine the extent of this behavior in gekkonid lizards. Arboreal species may coincidentally aggregate fecal material while at a favorite perch site. This differs from purposeful aggregation as exhibited by Coleonyx. Any observations on gekkonid lizards, whether demonstrating fecal aggregation or not, would be greatly appreciated. Please contact James D. Jenkins, Department of Zoology, Arizona State University, Tempe, Arizona 85281.

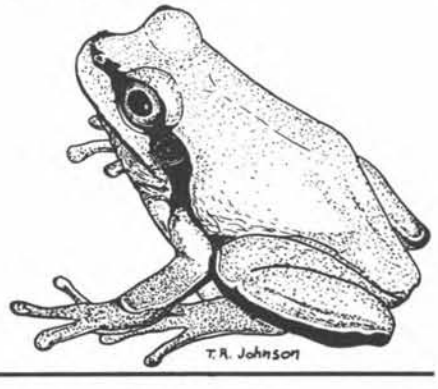
GAMBELIA PRESERVE PLANNED

The Golden Valley Ecological Society (P. O. Box 709, Clovis, California 93613) is seeking to purchase and now in escrow as a preserve for Blunt-nosed leopard lizards. They need contributions for purchase funds urgently. Contributions are tax deductible (pending final federal ruling--state tax exempt status approved) and would be greatly appreciated.

HR 9(3) ERRATA

Page 109, column 1, para. 2, lin 4: C. rotalus should read Crotalus.

Page 109, column 1, para. 3, line 6: masticophis should read Masticophis.



LETTER TO THE EDITOR REGARDING COMMON NAMES LIST

The recently published "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" (1978, SSAR Herpetological Circular No. 7) stated that it followed, with few exceptions, the common names used by Stebbins (1966, A Field Guide to Western Reptiles and Amphibians) and Conant (1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America). In point of fact, the SSAR publication diverges from the common names used by Stebbins and Conant for no fewer than 146 taxa, divergences not required by taxonomic changes. In most instances the change consists of dropping an -ed ending to convert a hyphenated, compound participial adjective into a nonhyphenated, compound noun form, e.g., the "Short-headed Garter Snake" becomes the "Shorthead Garter Snake."

We strenuously object to these changes for the following reasons: 1) They violate the spirit of article 4d in the Harbrace College Handbook, which states in effect that the use of noun forms as adjectives should be avoided when they are either awkward or ambiguous and appropriate adjectives are available. To our ears many of the new names do sound awkward, a few could be ambiguous to the nonherpetologist (is a Blackhead Snake covered with dark spots that resemble blackheads?), and for each of them an appropriate adjective does exist. We believe the scientific community should support proper usage of the English language, not contribute to its deterioration. 2) The changes are inconsistently applied. The "Black-striped Snake" remains unchanged, while two of the ribbon snakes become the "Redstripe Ribbon Snake" and the "Bluestripe Ribbon Snake," respectively. The "Short-tailed Snake" remains unchanged, while the "Flatheaded Snake" becomes the "Flathead Snake." Similar examples are legion. 3) No rationale is presented for any of the changes; hence they appear to have been made solely for the sake of change.

The Committee on Common and Scientific Names strongly urged that everyone use their standardized list of common names in all conceivable circumstances in order to stabilize and clarify the use of these names by the herpetological community and the general public. Inasmuch as many of the changes they have proposed are grammatically unsound, inconsistently applied, and, as far as we can determine, unnecessary, we strongly urge that the herpetological community reject these changes and continue to follow the common names used by Stebbins (1966) and by Conant (1975) until such time as the Committee on Common and Scientific Names issues a revised list that eliminates, or at least comes to grips with, these objections.

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"COMMON NAMES" -- A DIFFERENT VIEWPOINT

I find myself in the embarassing position of agreeing somewhat more closely with the critics (Rossman et al., 1978) of a Committee Report (Collins et al., 1978a) bearing my name than with the response authorized by a majority of that Committee (Collins et al., 1978b). However, my disagreement is limited to certain select points. For example, I think that, in general, the changes made by the Committee were, indeed, conservative and, although I may have reservations about particular choices, I think that on the whole the current list is a good one, otherwise I could not have agreed to have it appear under my name. With the exception of the specific points listed below, I urge that the list be used, until a better version can be produced.

The one point on which I agree with Rossman et al. (1978) and others (personal communication) is in the correct English grammatical usage of hypenated, past-participial adjectives (e.g., Black-headed Snake) vs. a supposed "noun-in-apposition" construction (e.g., Blackhead Snake). Although the only reference cited in this matter (Bailey et al., 1970) states that the "spottail shiner" and "soupfin shark" illustrate "Compounded modifying words, including paired structures, (which) should usually be treated as nouns in apposition...", (emphasis mine) this is an unfortunate oversimplification and relaxation of usage. A true noun in apposition such as: "Walter Washington, first mayor of Washington, DC, requested..." or "Zoologist John Q. Doe, discoverer and describer of over 155 taxa of amphibians and reptiles, claimed..." involves a construction which the appositive fragment, set off by commas, is an exact equivalent (not a modifier) of the noun to which it is in apposition. Since one can use titles (in the broadest sense of the word) preceding a noun which they modify: "Mayor Walter Washington requested ...", some are tempted to use such noun-adjectives and call them "appositives". This leads to such clumsy constructions as: "Discoverer-and describer-of-over-150-taxa-of-amphibians-and-reptiles-zoologist John Q. Doe claimed..."

By analogy, one can thus refer to Muscivora forficata as the Scissor-tailed Flycatcher (Peterson, 1947; Bull and Farrand, 1977), or as is done by ranchers of the southwest, truly using a common name and a descriptive noun , call it a "Scissortail" (personal observation). This presents no problem. But the noneuphonic, nongrammatical, nonlogical "Scissortail Flycatcher" or "Blackhead Snake" strikes my ear with the same dissonance as "A beautiful, blue-eye woman; a handsome, redhair man, or: Look at the spot Dalmation dog!"

Having made what I hope is a convincing argument to the reader that some semblance of logic and grammar be retained in the English language wherever possible, I should like to make a second, seemingly orthogonal argument: It really doesn't make any difference from the point of view of communications whether one follows Collins et al., (1978a) or Rossman et al. (1978). Although the "Blackhead Snake" as used by a majority of the Committee grates on my sensibilities, I have no difficulty recognizing that a member of the genus Tantilla is involved, nor does anyone reading my preferred usage. Unlike scientific nomenclature where, for purposes of preciseness, certitude, and priority, the changing of a single letter results in a completely different epithet, the usage of common, or English names does not, nor should it, require such legalisms. Thus, I regret what I perceive to be a trend towards expecting absolute conformity in the use of an "official" list of common names: The use of Black-headed vs. Blackhead is inconsequential (preservation of English as a logical, informative language aside) compared to the usage of Uma vs. Uta for certain western North American lizards. The true difficulties in communication will arise if Author A uses Tantilla = Black-headed Snakes, Author B uses Tantilla = Crowned Snakes, and Author C uses Tantilla = Black-headed and Crowned Snakes. (An aside: Why not the Crown Snake?

Probably because everyone's limit of noneuphonism is reached eventually and constructions such as a Crown Snake, a Birdvoice Treefrog, and a spot dog sound ludicrous to all.) Good nomenclature should provide clarity and, much more important for scientific than popular nomenclature, stability. Compatibility and consistency need not necessitate absolute congruence. Although scientific nomenclature is, necessarily, belabored by the requisites of orthography and priority, the use of English names is not so encumbered; may I request more good judgment and flexibility in place of absolute conformity?

I have a third request. None of the names on the list of "common" names would be at all common in Mexico or, if that be objected to as extralimital, in parts of Quebec. Furthermore, I believe that residents of the southern Appalachians would recognize only about one-quarter of the "common" names given for the Great Smoky Mountains (Huheey and Stupka, 1968). As demonstrated in two papers recently called to my attention (Parkes, 1975; 1978), what we are really discussing here are standardized English names.

It may appear incongruous for a member of the Committee on Common and Scientific Names of the SSAR to appear to dissent from a report of that Committee. This is not the case. I believe the report (Collins, et al., 1978a) is a good one, and in those several instances in which I disagreed with the majority, I allowed my opinions to be overruled in deference to my respect for the professional opinions of the others, and my feeling that, for the reasons cited above, one should never consider a list of English names to be engraved upon stone, but as a flexible, constantly improvable, and currently useful list. It is with the hope that such improvement may ever be forthcoming that I offer my dissent. I would plead that all of those interested in the subject of English or common names retain open minds--maximum communication is the ultimate goal, not any one person's (including my own) perception of the "truth".

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THE RATIONALE FOR NAME-CHANGES IN THE COMMON NAMES LIST

The issues raised by Rossman, et al. in the critique of the SSAR "Standard Common and Current Scientific Names for North American Amphibians and Reptiles" require explanations that no doubt should have been given in the introduction to our list. They are belatedly provided here.

First, although "no fewer than 146 taxa" have been assigned altered common names by the SSAR Committee, this does not appear to be excessive when compared to the total number of names (over 1,200) which appear in the list. A twelve percent divergence from the names used by Conant and Stebbins in their Field Guides is not an extensive rearrangement.

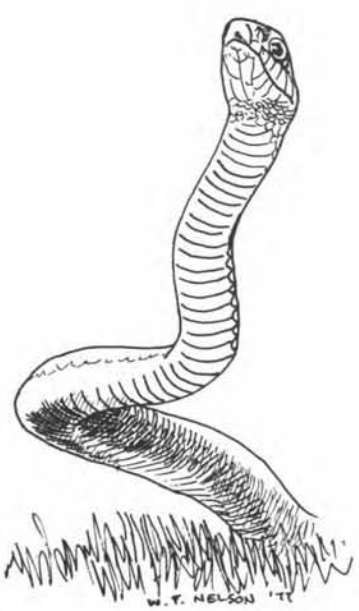
Second, although we cannot argue against rules or recommendations made in the Harbrace College Handbook, the use of non-hyphenated, compound nouns is not illegal, and is, in fact, more concise and more easily used in speaking. Common names are used by persons not familiar with scientific names, and will be adopted only if easily understood and easily spoken. The English languate is not inflexible, and allows for such alterations to permit ease of use.

Third, the common name changes involving elimination of the hyphen and -ed ending are very consistently applied. Wherever previously hyphenated common names represented an unpaired structure (i.e., head, throat, belly, tail, mouth, nose, back, chin, skin, mask, hood) or a feature appearing singularly on a taxa (i.e., a single stripe), the hyphen and -ed ending were eliminated. The only exceptions (conformant with the Harbrace College Handbook) to this convention (involving five names out of 1,208) were four which would have produced a difficult double consonant (tt) and Birdvoiced Treefrog. Voice was not readily assignable as a singular structure and was retained in its original form. The -ed ending only adds length to a common name, and the use of a hyphen adds to the possibility of mistakes occurring in transliteration.

Fourth, the rationale to alter common names was based on 1) a desire to produce more concise (and, hence, more easily used) common names, and 2) recognition that other common name lists are implementing the alterations we employed (see A List of Common and Scientific Names of Fishes, AFS Spec. Pub. 6, third edition, 1970).

Finally, the SSAR Common Names List, when considered in its entirety, must surely be considered conservative and conventional when compared with the 1956 ASIH list, and, thus, would hopefully receive reasonable acceptance by the herpetological community. As generally stated in the introduction of the SSAR Common Names List, we again strongly urge that all persons use the proposed names in the interest of stability and clarity.

JOSEPH T. COLLINS, JAMES L. KNIGHT, and HOBART M. SMITH, SSAR Committee on Common and Scientific Names. ●



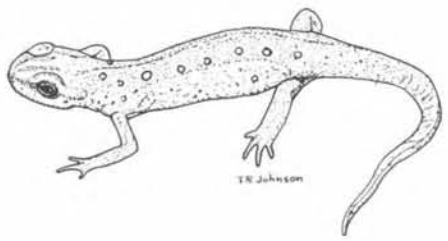
Current Literature

As of March, 1978, approximately 87 searchers are scanning 450 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

A new feature of Current Literature is the inclusion of senior author addresses. Although only a small portion of the citations have the addresses included in this issue, it is a goal to publish addresses for a majority of the citations for Current Literature in 1979.

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Adult wandering garter snake, Thamnophis elegans vagrans, consuming an unidentified vole on 16 June 1978 at 1315 hours at Down Springs Rest Area, Flamingo Gorge National Recreational Area, Daggett County, Utah. ASA 25 1/60 sec. f 5.6; 55 mm plus 2x lens. Photograph by James D. Jenkins, Department of Zoology, Arizona State University, Tempe, Arizona 85281.

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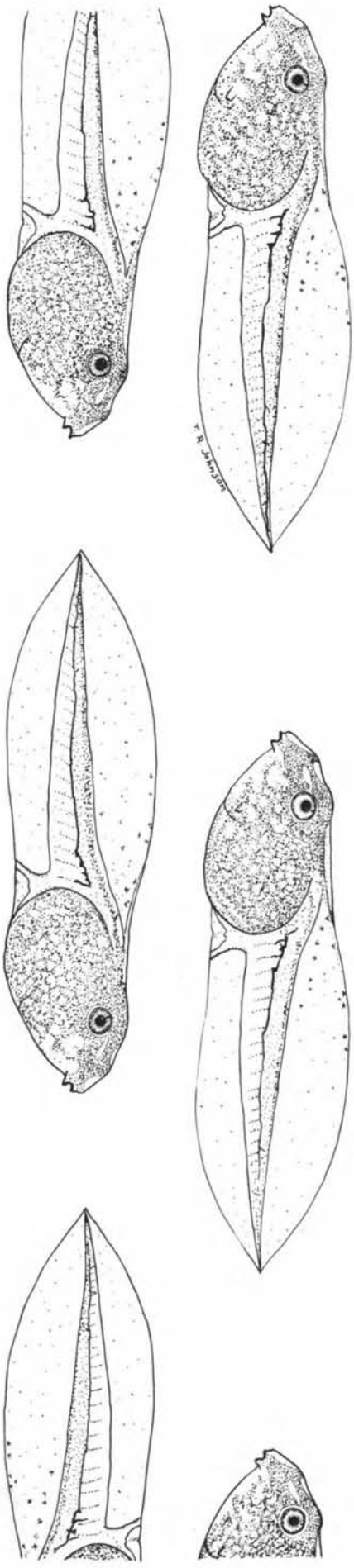
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Contents

SSAR ANNUAL MEETING NEWS
Titles of papers presented at the SSAR annual meeting at Arizona State University, Tempe 82
FEATURE ARTICLES
Herpetology on the Lewis and Clark Expedition 1804-1806, by K. R. Benson 87
A technique for the collection of serological and chromosomal material from small reptiles, by W. R. Branch 91
Two black rat snakes from one egg, by B. Schuette 92
Notes on three species of Micrurus (Serpentes: Elapidae) from Mexico, by R. M. Blaney and P. K. Blaney 92
Observations on an audio-visual "warning" signal in the pigmy rattlesnake, Sistrurus miliarius (Reptilia, Serpentes, Crotalidae), by A. Marchisin 92
The status of suppressed names and of Callopsis Gray (Reptilia: Testudines), by H. M. Smith 93
Feral dog predation of the gopher tortoise, Gopherus polyphemus (Reptilia, Testudines, Testudinidae) in southeast Alabama, by M. K. Causey and C. A. Cude . . 94
HERPETOLOGICAL HUSBANDRY
Photoperiod and reptile reproduction, by J. P. Jones 95
Observations on the reproduction of the emerald tree boa, Corallus caninus, by J. D. Groves 100
BOOK REVIEWS
"To Catch a Crocodile: Hunting in Papua/New Guinea" by Peter Pinney. Reviewed by J. Behler 102
"Amphibians and Reptiles in Alaska, The Yukon and Northwest Territories" by Robert Parker Hodge. Reviewed by M. M. Stewart 102
LEGISLATIVE ALERT
Legislative news, by T. J. Berger 103
REGIONAL SOCIETY NEWS
Chicago Herpetological Society 104
Arizona Herpetological Association 104
SSAR directory of regional herpetological societies 105
GEOGRAPHIC DISTRIBUTION
New records 106
A second Mexican specimen of Crotalus willardi obscurus from the Sierra San Luis, Chihuahua, with comments on other members of the herpetofauna, by J. R. McCranie and L. D. Wilson 108
Sternotherus minor (Reptilia, Kinosternidae) in the Pascagoula River System, Mississippi, by C. J. McCoy, A. V. Bianculli, and R. C. Vogt 109
NEWS NOTES 109
CURRENT LITERATURE 110

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SSAR Annual Meeting News

Titles of Papers Presented at the SSAR Annual Meeting at Arizona State University, Tempe

Listed below are titles of herpetological papers presented at the 21st Annual Meeting of the Society for the Study of Amphibians and Reptiles held at Arizona State University, Tempe, in conjunction with the annual meetings of the American Society of Ichthyologists and Herpetologists and the Herpetologists' League. Also included are the name and address (as available) of the individual presenting the paper. SSAR members wishing a copy of an abstract should contact the author. Papers presented by title only are not listed.

ADEST, GARY
The relations of the sand lizards Uma, Callisaurus, Cophosaurus, and Holbrookia: an electrophoretic study. University of California, Los Angeles.

BACON, JAMES P.
Captive management of Geochelone elephantopus. San Diego Zoo.

BADER, ROBERT N.
Introduced amphibians and reptiles in south Florida and their effects on some native species. Brookneal, Virginia.

BAGNARA, JOSEPH T.
The Mexican leaf frog in captivity. University of Arizona, Tucson.

BEATTY, JOSEPH J.
Morphological variation in the clouded salamander, Aneides ferreus. Oregon State University.

BEHLER, JOHN L.
Breeding crocodilians in captivity: the current state of the art. Department of Herpetology, New York Zoological Society, Bronx, New York.

BENNETT, ALBERT F.
Speed and work capacity in small lizards. Biological Sciences, University of California, Irvine.

BERRY, JAMES F.
Distribution and phenetic relationships in Central American and Mexican Kinosternon scorpioides (Reptilia: Testudines: Kinosternidae). Dept. of Biology, University of Utah, Salt Lake City.

BERRY, KRISTIN H.
A preliminary report on the status of the desert tortoise in California. California Desert Program, Bureau of Land Management.

BIELITZKI, JOSEPH T.
The nutrition of captive reptiles. University of Washington.

BINKOWSKI, FRED P.
The routine and diurnal fluctuation in metabolism of the Ozark hellbender, Cryptobranchus alleganiensis bishopi. Zoology Department, University of Wisconsin-Milwaukee.

BIZER, JOHN R.
Growth rates and sizes at metamorphosis within and among populations of the tiger salamander. Rocky Mountain Biological Laboratory.

BLANEY, RICHARD M.
Taxonomic consideration of individual variation--a commentary. West Virginia State College.

BLOOM, CHARLES H.
Principal components analysis of the thermal niche of Hemidactylus turcicus turcicus. Baylor University.

BOHLIN, RAYMOND G.
Thermal exchange times of the aquatic salamander, Amphiuma means. North Texas State University.

BOWLER, J. KEVIN
Modern management and exhibit techniques for reptiles. Philadelphia Zoo.

BRAMBLE, DENNIS M.
Functional and evolutionary correlates of burrowing behavior in gopher tortoises. Dept. of Biology, University of Utah, Salt Lake City.

BRODE, JOHN M.
Protection of amphibians and reptiles in Californa. California Department of Fish and Game.

BROOKS, GARNETT R.
Methods for estimating home range size in lizards: an evaluation. College of William and Mary.

BROWN, WESLEY M.
The origin and relative age of parthenogenetic lizards (Genus Cnemidophorus) as determined by mitochondrial DNA analyses. University of California, San Francisco.

BRUCE, RICHARD C.
Metamorphosis and life-cycle partitioning in the salamander Gyrinophilus porphyriticus. Western Carolina University.

BURY, R. BRUCE
UMA to UMA. National Fish and Wildlife Laboratory.

BUSH, MITCHELL
Antibiotic studies in snakes and turtles. National Zoological Park, Washington, D.C.

BUTLER, JOSEPH A.
A comparison of heating and cooling rates of summer-acclimated and spring-acclimated queen snakes, Regina septemvittata (Say). Ohio State University.

CADLE, JOHN
Genetic differentiation in the plethodontid salamander Aneides ferreus. University of California, Berkeley.

CANNATELLA, DAVID
A systematic re-assessment of phyllomedusine frogs. University of Kansas, Lawrence.

CARPENTER, CHARLES C.
An ethological approach to reproductive success in reptiles. Univeristy of Oklahoma, Norman.

CHRISTMAN, STEVEN P.
Successful changes in community structure: amphibians and reptiles in Florida Sand Pine Scrub. National Fish and Wildlife Laboratory, Gainesville, Florida.

COLLINS, JAMES P.
The selective advantage of neoteny in salamanders. Arizona State University, Tempe.

COLLINS, JOSEPH T.
Summary of the symposium of reproductive biology of captive reptiles. University of Kansas, Lawrence.

CONANT, ROGER
Introduction and historical perspectives. University of New Mexico, Albuquerque.

COWAN, DANIEL F.
Adaptation, maladaptation and disease. University of Texas, Houston.

CREWS, DAVID
Methods for inducing reproduction in captive reptiles. Harvard University.

DAUGHERTY, CHARLES H.
Evolution and systematics of the genus Dicamptodon. Department of Zoology, University of Montana, Missoula.

DEAKINS, DENNIS E.
Helminth diagnosis and treatment in captive reptiles. Scott and White Hospital.

DERICKSON. W. KENNETH
Resource availability and reptilian life history strategies. Biotic considerations. Argonne National Laboratory.

DEWEESE, JAMES E.
Chromosomal load in the leptodactylid frog genus, Eleutherodactylus. University of Southern California.

DIAL, BENJAMIN E.
Physiological and ecological correlates in sympatric Coleonyx. North Texas State University.

DOLENSEK, E. P.
Reptilian anesthesia. New York Zoo.

DUNHAM, ARTHUR E.
Proximal sources of variation in age-specific fecundity, individual growth rates, and levels of stored lipids in two iguanid lizards. University of Michigan, Ann Arbor.

DUNSON, WILLIAM A.
A new salt gland in a marine homalopsid snake. Pennsylvania State University, State College.

DUVALL, DAVID
Chemical-signal release of display action-patterns and mediation of a conspecific odor preference in western fence lizards (Sceloporus occidentalis). University of Colorado, Boulder.

DUVALL, DAVID
Stimulation of land-drive in recently transformed tiger salamanders (Ambystoma tigrinum) by endogenous or exogenous thyroxine. University of Colorado, Boulder.

EAGLESON, GERALD W.
Histological studies of larval, metamorphosing, neotenic, and transformed Ambystoma gracile. University of Texas, Austin.

EHRENFELD, DAVID W.
Commercial breeding in captive sea turtles: status and prospects. Rutgers University.

ELIAS, PAUL
Biogeography of the plethodontid salamanders of Nuclear Central America. University of California, Berkeley.

EMERSON, SHARON B.
The ilio-sacral articulation in frogs: form and function. University of Illinois at Chicago Circle.

ERSKINE, DALE J.
A computer simulation of closed-system respirometry with small ectotherms. Dept. of Zoology, University of Oklahoma, Norman.

FELLERS, GARY M.
The breeding behavior of Hyla versicolor and Hyla crucifer. Department of Biological Sciences, California State University, Sacramento.

FERGUSON, GARY W.
Differences in growth of two species of Sceloporus in similar laboratory environments. Texas Christian University.

FITCH, HENRY S.
Reproductive strategies of reptiles. University of Kansas, Lawrence.

FITZGERALD, KEVIN T.
Mate selection as a function of body size. University of Colorado, Boulder.

FORD, NEIL B.
Orientation to pheromone trails in thamnophiine snakes. Miami University, Oxford, Ohio.

FOWLER, MURRAY E.
A summary and some differential diagnostic concepts applicable to reptiles. University of California, Davis.

FROST, J. S.
Interspecific reproduction isolation of Arizona leopard frogs. University of Arizona, Tucson.

FROST, SALLY K.
The dual function of xanthine dehydrogenase during Mexican leaf frog (Pachymedusa dacnicolor) development and metamorphosis. University of Arizona, Tucson.

GATTEN, JR., ROBERT E.
Aquatic oxygen uptake in snapping turtles (Chelydra serpentina). Dept. of Biology, Univ. of Toledo, Ohio.

GILLINGHAM, JAMES C.
Analysis of combat behavior in the rat snake, Elaphe obsoleta. Central Michigan University.

GLIDEWELL, J. R.
Metabolic compensation to seasonal temperatures in the red-eared turtle, Chrysemys scripta. North Texas State University.

GODLEY, J. STEVE
Feeding behavior and handling time in newborn striped swamp snakes, Regina alleni. University of South Florida, Tampa.

GOLDBERG, STEPHEN R.
Reproduction in two Namib Desert lacertid lizards (Aporosaura anchietae and Meroles cuneirostris). Whittier College.

GONG, JULIANN D.-U.
Histological changes in the urogenital organs and interrenal tissue of the male lizard Anolis carolinensis following estradiol treatments. University of Nebraska, Omaha.

GREEN, DAVID M.
Morphological and functional characters of treefrog digital pads using scanning electron microscopy. University of Guelph, Canada.

GREENE, HARRY W.
Skinks, snakes, and the predator-prey race. University of Pennsylvania.

GREGORY, PATRICK T.
Temperature relationships of garter snakes on Vancouver Island. University of Victoria, British Columbia.

HALL, RUSSELL J.
Effects of selected pesticides on larval and adult amphibians. Patuxent Wildlife Research Center, Laurel, Maryland.

HAMMERSON, GEOFFREY A.
The applicability of the "Preferred body temperature" concept to snakes: examples from the genus Masticophis. California State University, Hayward.

HANKEN, JAMES
Genetic diversification within the salamander genus Thorius. Museum of Vertebrate Zoology, University of California, Berkeley.

HARLAN, RICHARD A.
The effects of dissolved oxygen content of water on blood pH, pCO2, p(w) and rocking activity for Cryptobranchus alleganiensis. Southwest Missouri State University.

HARRISON, JULIAN R.
Preliminary observations on the status and distribution of two color pattern morphs in South Carolina populations of Eurycea quadridigitata (Holbrook). The College of Charleston.

HAZARD, E. STARR
Ontogenetic changes in erythrocytic phosphates in the bullfrog, Rana catesbeiana. Dept. Zoology, Univ. Oklahoma, Norman.

HEBRARD, JAMES J.
Annual variations in resource partitioning among four syntopic

Nerodia. Louisiana State University.

HENDRICKSON, J. R.
Evidence for population discrimination in marine turtles by amino acid analysis of shell keratin. University of Arizona, Tucson.

HERRON, M. R.
Surgery and radiography of reptiles. Texas A & M University, College Station.

HIGHTON, RICHARD
The genetic relationships of the woodland salamanders of the genus Plethodon. University of Maryland, College Park.

HOWARD, RICHARD D.
Mating systems of bullfrogs and woodfrogs. Bowling Green State University.

HUEY, RAYMOND B.
Zoogeographical, ecological, and reproductive consequences of altitude in amphibians and reptiles from western North America. University of Washington.

HUFF, THOMAS A.
Captive propagation of the boinae, with particular emphasis on the genus Epicrates. Reptile Breeding Foundation, Pickton, Ontario.

HUGHES, ANDY
Erythrocytic organic phosphates: diel cycle in the diamondback water snake, Nerodia rhombifera. Dept. of Zoology, Univ. of Oklahoma, Norman.

HUNT, R. HOWARD
Propagation of the Morelet's crocodile, Crocodylus moreleti, for restocking. Atlanta Zoo, Georgia.

HUNTLY, ANTHONY C.
Sleep in the western toad, Bufo boreas. California State University, Fullerton.

HUTCHISON, VICTOR H.
Erythrocytic organic phosphates: diel and seasonal cycles in the frog Rana berlandieri. University of Oklahoma, Norman.

IVERSON, JOHN B.
Colic modification and the herbivory-body size correlation in lizards. University of Florida, Gainesville.

JACKSON, DALE R.
Effects of severe drought on the herpetofauna (and ichthyofauna) of a Florida marsh. University of Florida, Gainesville.

JACOB, JAMES S.
The heart rate-ventilatory response in terrestrial snakes. Memphis State University, Tennessee.

JACOBSON, ELLIOTT
Viral diseases of reptiles. University of Florida, Gainesville.

JACOBSON, ELLIOTT
Mycotic diseases of reptiles. University of Florida, Gainesville.

JACOBSON, ELLIOTT
Neoplastic diseases of reptiles. University of Florida, Gainesville.

JAEGER, ROBERT G.
Foraging tactics of the salamander Plethodon cinereus. State University of New York, Albany.

JENKINS, JAMES D.
Preferred defecation sites in the banded gecko Coleonyx variegatus. Arizona State University, Tempe.

JENSSEN, THOMAS A.
Vocalizations by an iguanid lizard, Anolis grahami. Virginia Polytechnic Institute and State University.

JOANEN, TED
Reproductive biology of the American alligator. Louisiana Department of Wildlife and Fisheries, Grand Chenier.

JOHN, KENNETH R.
Periphery versus volume of container in growth of crowded tadpoles. Franklin and Marshall College.

JOHNSON, JAMES E.
Developing critical habitat for the Houston toad (Bufo houstonensis). U.S. Fish and Wildlife Service, Albuquerque.

JUTERBOCK, J. ERIC
Evolutionary implications of variation in desmognathine jaw tooth morphology. Ohio State University, Columbus.

KAPLAN, ROBERT H.
Size and shape as constraints on reproduction in salamanders. Brooklyn College, New York.

KARLIN, ALVAN A.
Natural hybridization between Desmognathus fuscus and D. ochrophaeus (Plethodontidae) in northern Ohio. Miami University, Oxford, Ohio.

KARLSTROM, ERNEST L.
Contributions to northwest herpetology: a historical review. University of Puget Sound.

KEEFER, TOM
Niche compression in two nocturnal lizards, and observations of intraspecific social behavior in a sphaerodactyline gecko. Austin, Texas.

KLEESE, WILLIAM C.
Environmental effects upon herpesvirus infections in sea turtles. University of Arizona, Tucson.

KLUGE, ARNOLD G.
Sexual selection, territoriality and the evolution of parental care in Hyla rosenbergi. Museum of Zoology, University of Michigan, Ann Arbor.

LABANICK, GEORGE M.
An experimental study of batesian mimicry between red-legged morphs of the salamanders Plethodon jordani and Desmognathus ochrophaeus. Southern Illinois University, Carbondale.

LAPOINTE, JOE
Activity cycles and thermoregulation in Xantusia (Klauberina) riversiana). New Mexico State University.

LEUCK, BETH E.
Shell variation in a population of three-toed box turtles (Terrapene carolina triunguis). University of Oklahoma, Norman.

LOMBARD, R. E.
Underwater hearing in frogs. University of Chicago.

LOOMIS, RICHARD B.
Ectoparasites of captive reptiles. California State University, Long Beach.

LUCKENBACH, ROGER A.
Lizard species diversity in aeolian sand habitats. University of California, Berkeley.

LYNCH, JAMES F.
Patterns of ontogenetic and geographic variation in the black salamander (Aneides flavipunctatus). Smithsonian Institution, Washington, D.C.

MANNES, JOSEPH D.
Heat hardening in amphibians. University of Oklahoma, Norman.

MANNES, S. J.
Thermal biology of Podocnemis vogli in the Venezuelan llanos. California State College, Sonoma.

MARCHISIN, ALLEN
Predator-prey relationships between pit vipers (Reptilia, Serpentes, Viperidae) and the ophiophagous snakes Lampropeltis getulus getulus and Drymarchon corais couperi (Reptilia, Serpentes, Colubridae).

MARCUS, LEONARD C.
Bacterial infections of reptiles. Massachusetts State Laboratory Institute.

MARLOW, RONALD WILLIAM
Energy relations in the desert

tortoise, Gopherus agassizi. University of California, Berkeley.

MAUTZA, WILLIAM J.
Metabolic and thermal correlates of reclusive behavior in xantusiid lizards. Cornell University, Ithaca, New York.

MAXSON, L. R.
Evolution in the salamander genus Plethodon: phylogenetic implications of MC'F studies of albumins. University of Illinois, Urbana.

MCDIARMID, ROY W.
Evolutionary and ecological consequences of reproductive behavior in centrolenid frogs. University of South Florida, Tampa.

MCGILLIS, SAMUEL M.
Thermoregulation in the green sea turtle, Chelonia mydas. California State University, Hayward.

MEANS, D. BRUCE
Reproductive ecology of the female eastern diamondback rattlesnake. Tall Timbers Research Station, Tallahassee, Florida.

MEANS, D. BRUCE
Telemetry and the eastern diamondback rattlesnake: preliminary results on home range and seasonal movements. Tall Timbers Research Station, Tallahassee, Florida.

MENDONCA, MARY T.
Preliminary observations on movements and food habits of lagoonal sub-adult green turtles (Chelonia mydas). Florida Technological University, Orlando.

MENGDEN, GREGORY A.
Artifical insemination in snakes. Houston Zoo, Texas.

MEYER, EUGENE R.
Large carnivore reproduction and parental care strategies. New York University.

MINTON, SHERMAN A.
Preliminary obervations on serological relationships of viperids. Indianapolis Medical Center.

MITTON, JEFFRY B.
Protein polymorphisms in Ambystoma tigrinum. University of Colorado, Boulder.

MONTALI, RICHARD J.
Necropsy procedures for reptiles. National Zoo, Washington, D.C.

MORTON, DAVID M.
Observations of the behavior of the western slender glass lizard, Ophisaurus attenuatus attenuatus. University of Oklahoma, Norman.

MURPHY, P. A.
Celestial compass orientation in juvenile American alligators. Savannah River Ecology Lab, South Carolina.

MUSHINSKY, HENRY R.
Behavioral and seasonal aspects of the thermal ecology of water snakes. Louisiana State University.

MUTH, ALLAN
A temperature sensitive tracking system: application to field studies of the desert iguana. University of Wisconsin, Madison.

NAPOLITANO, RAYMOND L.
Reptilian amebiasis, current investigations. New York Zoological Society.

NELSON, CRAIG E.
Myrmecophagy in the microhylinae and in other frogs. Indiana University.

NICOLA, STEPHEN J.
The California Department of Amphibians and Reptiles? California Department of Fish and Game.

MORRIS, DAVID O.
Endocrine factors controlling metamorphosis in Ambystoma tigrinum. University of Colorado.

OHMART, ROBERT D.
A physiological model to control cyclic reproductive events in the green sea turtle. Colorado State University.

PACKARD, MARY J.
Structure of eggs of Trionyx spiniferus: an avian egg in a chelonian shell. Colorado State University, Fort Collins.

PAPENFUSS, THEODORE J.
Bipes: the benefit of a little more tail. University of California, Berkeley.

PERRILL, STEPHEN A.
Sexual parasitism in the green treefrog (Hyla cinerea). Butler University.

PETERSON, J. A.
Electromyographic and radiographic analysis of locomotion in the tegu lizard. University of California, Los Angeles.

PIERCE, BENJAMIN A.
Neoteny or paedogenesis? University of Colorado, Boulder.

PLATT, JAMES E.
Prolactin, sodium retention, and antagonism of metamorphosis in Ambystoma tigrinum. University of Denver, Colorado.

PORZER, LAUREN M.
Movements and behavior of the gila monster in the Queen Creek area, Pinal County, Arizona. Arizona State University, Tempe.

POSSON, MARK
Quantitative and qualitative characteristics of rattlesnake rattle sounds. California State University, Fullerton.

POUGH, F. HARVEY
Altitudinal character gradients in a Puerto Rican treefrog, Eleutherodactylus coqui. Langmuir Laboratory, Cornell University, Ithaca, New York.

PRESCH, WILLIAM
Evolutionary relationships of microteiid lizards. California State University, Fullerton.

PRESLAR, A. J. III.
Energetics of activity in the salamander Amphiuma tridactylum. University of Oklahoma, Norman.

PRICE, ANDREW HOYT
Structure-functional aspects of the scent gland in Lampropeltis getulus splendida. New Mexico State University.

PRICE, ROBERT
Scanning electron microscopy of snake scales: methodology and a preliminary evaluation of microdermatoglyphics in colubrine taxonomy. New York University.

RAND, A. STANLEY
The function of variability in the mating call of Physalaemus pustulosus. Smithsonian Tropical Research Institute, Canal Zone.

RENAUD, MAURICE L.
Protein and mating call variation in Hyla wrightorum, H. regilla and H. eximia. Arizona State University, Tempe.

RICHARDS, CHRISTINA M.
Precocious induction of adult color pattern by steroid hormone treatments during metamorphosis in the Kenyan reed frog, Hyperolius v. viridiflavus. University of Michigan, Ann Arbor.

ROBERTS, JOHNNA B.
Evidence for a lipid barrier to water loss in snake epidermis. University of Kansas, Lawrence.

ROGERS, JAMES S.
Herpetofaunal areas of Texas. University of New Orleans, Louisiana.

ROMANO, MICHAEL A.
Biochemical systematics of three genera of old and new world natricine snakes. University of Vermont.

ROSS, RICHARD
Captive propagation of pythons. Institute for Herpetological Research, Stanford, California.

RUTH, STEPHEN B.
Comparative information on the

population biology of two sceloporine lizards. Tuskegee Institute, Alabama.

RYAN, MICHAEL J.
The male mating strategy of the bullfrog, Rana catesbeiana. Cornell University.

SAGE, RICHARD D.
Evolutionary history of Ambystoma macrodactylum. University of California, Berkeley.

SAGE, RICHARD D.
Evolution of the leopard frogs (Rana pipiens complex). University of California, Berkeley.

SAVITZKY, ALAN H.
Hinged teeth: an unrecognized feeding specialization in snakes. U.S. National Museum of Natural History, Washington, D.C.

SCHWALM, PATRICIA ANN
Development of infrared reflectance in the phyllomedusine hylid, Pachymedusa dacnicolor. University of Chicago.

SEIB, ROBERT L.
Implications of similarity in patterns of snake species diversity in coffee fincas of Guatemala and Panama. University of California, Berkeley.

SEIGEL, RICHARD A.
Reproductive activity in the diamondback terrapin, Malaclemys terrapin tequesta. Florida Technical Univ., Orlando.

SERVAGE, DAVID
Biosystematics of the Ambystoma jeffersonianum complex in Ontario. Univ. of Guelph, Canada.

SEVER, DAVID M.
A new Eurycea from the southern Applachian Mountains. St. Mary's College, Notre Dame, Indiana.

SHINE, RICHARD
Sexual size dimorphism in reptiles and amphibians. Department of Biology, University of Utah.

SHOOP, C. ROBERT
Larval and male juvenile survivorship in Ambystoma opacum. University of Rhode Island.

SLEMMER, GLENN
Maintenance and breeding of colubrid snakes. University of British Columbia.

SLIZGI, GARY R.
Diet analysis among different morphological phenotypes of a single population of Uta stansburiana. Duke University.

SMITH, KATHLEEN
A cineradiographic and electromyographic study of feeding in lizards. Harvard University.

SMITS, ALLAN W.
Thermal ecology and activity patterns of the western toad, Bufo boreas halophilus. California State University, Hayward.

SWEET, SAMUEL S.
The validity of the genus Typhlomolge: a test with a new species. University of California, Santa Barbara.

TAIGEN, THEODORE L.
Changes in mass of softshell turtle (Trionyx spiniferus) eggs incubated on substrates differing in water potential. Colorado State University, Fort Collins.

TOLLESTRUP, KRISTINE
Reproduction, foraging behavior, and social structure in two species of leopard lizards. University of California, Berkeley.

TRYON, BERN W.
Observations on reproduction in the west African dwarf crocodile, Osteolaemus tetraspis, with a description of maternal behavior. Fort Worth Zoo, Texas.

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VETTER, RICHARD S.
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Herpetology on the Lewis and Clark Expedition 1804-1806

One of the main goals of the overland exploration to the new Northwest territory, commissioned by Thomas Jefferson and led by Meriwether Lewis and William Clark between 1804-1806, was to compile a comprehensive list of the flora and fauna of the Northwest region. As a result, the journals Lewis and Clark kept during their journey to the Northwest contain a wealth of information concerning the natural history of the area. Typical of the thrust in natural history during the early part of the nineteenth century, their journal accounts reflect an overwhelming preoccupation with ornithology, botany and mammalogy. Mammals received particular attention because of their importance both as a food source for the naturalists and for the economic value of their fur. The herpetological forms of this area are given little treatment in the journals. Most references to reptiles and amphibians are of an incidental nature and, therefore, appear to be subsidiary information to the main body of knowledge compiled by the expedition. In spite of the "second billing" status of herpetology on the overland exploration, much information can be obtained concerning these animals by a careful examination of the journal passages in which references are made to reptiles and amphibians.

Unfortunately, there has been little attention paid to the herpetological observations of Lewis and Clark. In fact, until fairly recently there have been few attempts to examine any of the natural history done on the expedition. Most of this neglect can be attributed to the tendency of treating Lewis and Clark as pioneering explorers, adventurous woodsmen and able military leaders. The Natural History of Lewis and Clark Expedition (Burroughs, 1961) and Lewis and Clark: Pioneering Naturalists (Cutright, 1969) have been two recent attempts directed toward providing an additional interpretation of the overland explorers. Both authors attempt to depict Lewis and Clark as able amateur naturalists by emphasizing the zoological aspects of the expedition. In this attempt, Burroughs and Cutright have set out to characterize the animal forms described by the two naturalists in their journals. Generally, the classifications have been enormously successful. However, complete satisfaction is lacking in reference to the classification and description of the herpetological forms.

There are several conjectural reasons to explain the unsatisfactory treatment of the reptiles and amphibians. First, many of the references Lewis and Clark made to these animals are very scanty and descriptively superficial. This fact alone has made exact identification of species difficult in many cases and almost impossible in a few instances. Secondly, neither Burroughs nor Cutright appear to have placed the necessary emphasis upon a careful scrutiny of the herpetological entries in the journals. It is not apparent that either author consulted a herpetologist to aid in these descriptions. Burroughs did not list any reference to herpetological guides, check lists or manuals in his bibliography. Cutright utilized only three herpetology references (Cope, 1900; Stejneger and Barbour, 1939; Schmidt, 1953). Two of these are quite old and none emphasizes western species. Thirdly, neither author appears to have an extensive personal acquaintance with the reptiles and amphibians of the Northwest. As a result, their identifications of species described by Lewis and Clark often rely upon reference to dominant species usually found in a given geographical area. In several cases, such a technique has resulted in erroneous identification.

The procedure followed in this study has been to refer to the journals of the expedition (Thwaites, 1904-05) to examine the field descriptions Lewis and Clark have provided concerning the animal they examined, and to consult, when necessary, herpetological field guides and maps to provide an accurate identity to the species under consideration (Stebbins, 1966). In several cases, the result of this study has been to correct previously erroneous identifications. Additionally, it has allowed identification of species not previously identified. However, there are a few instances in which several possible species are provided instead of the one species usually described. In these cases, the problem is one of narrowing the possible species down to the most likely species; that is, the descriptions offered in the journals do not allow for a more precise identification.

SALAMANDERS

1. Taricha granulosa, rough-skinned newt

William Clark, Fort Clatsop, Oregon, March 12, 1806.

"There is a species of water lizard of which I only saw one just above the grand rapid of the Columbia. it is about 9 inches long the body is reather flat and about the size of a mans finger, covered with a soft skin of dark brown colour with an uneven surface covered with little pimples, the neck and head are short, the latter terminating in an accute angular point and flat, the fore feet each have four toes, the hinder ones five unconnected with a web and destitute of tallons. it's tail was reather longer than the body, and in the form like that of the Muskrat, first riseing in an arch higher than the back, and descending lower than the body at the extremety, and flated perpendicularly. the belley and under part of the neck and head were of a Brick red every other part of the colour of the upper part of the body are dark brown the mouth was smooth without teeth." (Thwaites, Vol. IV, p. 162.)

The skin texture, coloration and general body description along with the habitat indicates that Clark was describing Taricha granulosa. While the venter is not characteristically "Brick red," specimens have been observed with a reddish orange color on the ventral surface (Stebbins, 1966). Clark noted that the "water lizzard" did not have teeth, but perhaps this incorrect observation was the result of a brief visual examination. If he had felt the roof of the mouth of Taricha, he would have noticed that the newt does have teeth, although they are not readily visible. The most convincing evidence for this identification, however, comes from the distribution of Taricha. It is the only newt or salamander found in the Columbia River region even closely resembling Clark's description.

Burroughs (1961, p. 280) erroneously identifies this newt as Diemyctylus torosus, the California newt. D. torosus is indigenous to California, not Oregon (Stebbins, 1966). Cutright (1969, p. 429) makes the same error as Burroughs. He also adds the incorrect species names of Tritorus torosus torosus and Triton torosus.

FROGS

2. Bufo boreas, western toad

Meriwether Lewis, Kamiah, Idaho, May 30, 1806.

"a large species of frog which resorts the water considerably larger than our bull frog, it's shape seems to be a medium between the delicate and lengthy form of our bull frog and that of our land frog or toad as they are sometimes called in the U'States. like the latter

their bodies are covered with little pustles or lumps, elivated above the ordinary surface of the body; I never heard them make any sound or noise." (Thwaites, Vol. V, p. 87).

Lewis's description is probably of a Bufo, and the only large Bufo frequenting this part of Idaho is Bufo boreas. While Lewis claimed to have never heard the toad call, western Bufo boreas does have a mellow chirping. However, the voice is not remarkable as B. boreas does not have a resonating vocal pouch (Stebbins, 1954). In addition, Bufo boreas is one of the anurans losing its species specific mating call. The toad is found in regions where no other similar species occurs and, consequently, little or no opportunities for cross-mating exist (Porter, 1972). Habitat and range characteristics of the frog from the journals are also consistent with current descriptions of Bufo boreas. The toad prefers water or moist habitats and is widely distributed throughout the Northwest, Idaho, Montana and Wyoming.

3. Hyla regilla, Pacific tree frog

4. Pseudacris triseriata, chorus frog

Meriwether Lewis, Yellowstone (Wyoming-Montana region), April 15, 1805.

"I heard the frogs crying for the first time this season; their note was the same with that of the small frogs which are common to the lagoons and swamps of the U. States." (Thwaites, Vol. I, p. 312)

Meriwether Lewis, Fort Clatsop, Oregon, March 29, 1806.

"The frogs are croaking in the swamps and marshes; their notes do not differ from those of the Atlantic States." (Thwaites, Vol. IV, p. 216.)

Meriwether Lewis, Fort Clatsop, Oregon, March 30, 1806.

"The frogs are now abundant and are crying in the swamps and marshes." (Thwaites, Vol. VI, p. 211.)

Meriwether Lewis, Kamiah, Idaho, May 30, 1806.

"a smal green tree-frog." (Thwaites, Vol. V, p. 87.)

The description, "a smal green tree-frog," definitely refers to Hyla regilla. It is a widespread species in the Northwest and is the species responsible for most of the calls and "crying in the swamps and marshes." However, the range of Hyla does not extend into the Yellowstone region. While Lewis did not mention actually observing the frog, he did note its voice similarity to the small frogs of the United States. My supposition is that Lewis may have been referring to the boreal chorus frog, Pseudacris triseriata, which is dispersed widely from the Rocky Mountains to the Eastern seaboard.

Cutright (1969, p. 428) refers to the frog in the Lower Columbia region between the Lewis River and Fort Clatsop as Rana pretiosa. This identification is highly unlikely. While the range of R. pretiosa may have been markedly reduced in the last 150 years by Rana catesbeiana, it probably had a very limited distribution west of the Cascades. When found in this area, it is usually limited to cold, fast waters. In addition, the voice of R. pretiosa is unknown (Stebbins, 1966). The journal entries made definite reference to the calls of the frog.

TURTLES

5. Trionyx spiniferus hartwegi, western spiny softshell turtle.

Meriwether Lewis, Musselshell River on eastern slope of Rocky Mountains, May 26, 1805.

"near it's entrance it had a handsome little stream of running water; in this creek I saw several softshelled Turtles which were the first that had been seen this season;" (Thwaites, Vol. II, p. 79).

William Clark, Musselshell River on eastern slope of Rocky Mountains, May 26, 1805.

"we passed 2 creeks on the Stard Side both of them had running water in one of those Creek Capt Lewis tells me he saw soft shell Turtle." (Thwaites, Vol. II, p. 83.)

William Clark, Tongue River in Yellowstone area, July 29, 1806.

"The river widens I think it may be generally Calculated at from 500 yards to half a mile in width more Sand and gravelly bars than above. cought 3 catfish. They were small and fat. also a Soft Shell turtle." (Thwaites, Vol. V, p. 307.)

There is only one softshell turtle which has a range into the Yellowstone region, Trionyx spiniferus hartwegi. Cutright (1969, p. 337) provides an incorrect name for this turtle, Amyda spinifera spinifera.

6. Chrysemys picta, painted turtle.

Meriwether Lewis, Great Falls, Montana, June 25, 1805.

"see a number of water terrapins." (Thwaites, Vol. II, p. 186.)

From this extremely abbreviated reference, positive identification of the turtle species is impossible. However, a conjectural identification based upon the range of specific turtles can be offered. Chrysemys picta is widely distributed in the Rocky Mountain region and is quite common in Montana.

Cutright (1969, p. 428) describes the turtle as Pseudemys troosti elegans or Emys elegans. The accepted name for this turtle is Chrysemys scripta elegans (Conant, 1975), but even this name is incorrect since this species had a more southern dispersal.

LIZARDS

7-8. Phrynosoma douglassi, pigmy horned lizard (P. d. douglassi) and Eastern short-horned lizard (P. d. brevirostre).

Meriwether Lewis, Upper Kooskooske between Walla Walla and the Bitter Root Mountains, May 29, 1806.

"a species of lizzard called by the French engages prairie buffaloe are native of these plains as well as those of the Missouri. I have called them the horned lizzard. They are about the size and a good deal of the figure of the common black lizzard. but their bellies are broader, the tail shorter and their action much slower; they crawl much like the toad. they are of a brown colour. arround the edge of the belley is regularly set with little horney projections which give to these edges a serrate figure the eye is small and of a dark colour. above and behind the eyes there are several projections of the bone which being armed at their extremities with a firm black substance has the appearance of horns sprouting out from the head. this part has induced me to distinguish it by the appellation of the horned Lizzard. I cannot conceive how the engages ever assimilated this animal with the buffaloe for there is not greater analogy than between the horse and the frog. this animal is found in greatest numbers in the sandy open parts of the plains, and appear in great abbundance after a shower of rain; they are sometimes found basking in the sunshine but conceal themselves in little holes in the earth much the greater proportion of their time. they are numerous about the falls of the Missouri and in the plains through which we past lately above the Wallahwallahs." (Thwaites, Vol. V, pgs. 80-81.)

Both Lewis and Clark made several other entries in the journals to the horned toad or "horned Lizzard." This species is so distinct that it is unquestionably Phrynosoma douglassi, the only species of horned lizard found in this area. There are two subspecies the naturalists probably encountered. In the Columbia River region, P. d. douglassi is commonly found, while the subspecies P. d. brevirostre is the horned toad observed in Montana, Wyoming and the Dakotas.

Cutright (1969, p. 428) incorrectly describes the horned lizard as Phrynosoma cornutum. The error can be attributed to lack of attention to range maps. P. cornutum is the species native to Texas, Oklahoma, New Mexico and northern Mexico. The northern species is P. doug-

lassi, which ranges from Oregon to the Dakotas.

9. Sceloporus occidentalis, Western fence lizard.

Meriwether Lewis, Fort Clatsop, Oregon, March 11, 1806.

"the black or dark brown Lizzard we saw at the rock fort Camp at the commencement of the woody country below the great narrows and falls of the Columbia; they are also the same with those of the United States." (Thwaites, Vol. IV, p. 155.)

There are numerous references of a casual nature referring to the "common Lizzard" or the black or "dark brown Lizzard." The problem with providing an accurate identification of these lizards is that there is not a species of lizard so ubiquitous in the United States to fit uniformly the widespread distribution to which Lewis refers. However, if we look back to Lewis' description of P. douglassi, there is a relative description of the "common black lizard." This lizard is about the same size and shape of the horned toad, but the abdomen is narrower, the tail longer and the action of the lizard is much more rapid. The general body description, shape and the habits of the lizard correspond to Sceloporus occidentalis, a species found throughout Oregon and a member of a genus which is spread across the United States. The only problem with this identification is that S. occidentalis has a brilliant blue to turquoise coloration on the belly. If Lewis had carefully examined this lizard, he should have been sufficiently impressed by the coloration to make note of it in the journals. Perhaps he did notice the coloring, but failed to make permanent record of it. Or, perhaps he could not capture the elusive lizard and did not notice the ventral coloring, or caught only dull-colored females or young. As previously mentioned, his lack of careful attention to detail in regard to the lizards can be explained by the general lack of interest in the collection of herpetological forms. From the sketchy descriptions of salamanders, turtles and frogs, it should be apparent that there was not much emphasis upon making a careful record of reptilian or amphibian detail.

The only other possible lizards that Lewis could have observed would have been Eumeces skiltonianus, Gerrhonotus coeruleus and Gerrhonotus multicarinatus. Again, E. skiltonianus is a brownish lizard with very rapid motion, but the body is very slender and in no way is similar to the horned toad. Additionally, this lizard usually has a bright blue tail, a fact sure to attract even the most casual observer. Both Gerrhonotus species could have been sighted, but Lewis's reference appears to be much more consistent with Sceloporus occidentalis. It is also quite probable that the naturalists could have lumped all sightings of lizards under the rubric of "common Lizzard."

SNAKES

10. Opheodrys vernalis, smooth green snake.

William Clark, Salt River, Missouri, September 19, 1806.

"saw a green Snake as high up as Salt Rivr on the Missouri." (Thwaites, Vol. VI, p. 229.)

From the distribution of green snakes, the only species Clark could have been describing is the smooth green snake, Opheodrys vernalis. It is the only snake with this coloration that inhabits the Missouri region. In addition, isolated populations are located in the mountains in the southern and western part of its range, which includes the Dakotas, Missouri, Wyoming, Montana and Idaho.

11-12. Pituophis melanoleucus, bullsnake or gopher snake.

Meriwether Lewis, Blair, Nebraska, August 5, 1804

"Killed a serpent on the bank of the river adjoining a large prairie

Length from nose to tail, 5F 2 Inch

Circumpherence in largest part, 4 1/2

Number of scutta on belly, 221

Dd. on Tale, 53

No pison teeth therefore think him perfectly inocent, eyes, center black with a border of pale brown yellow Colour of skin on yead yellowish green with black specks on the extremity of the scuta which are pointed or triangular colour of back, transverse stripes of black and dark brown of an inch in width, the end of the tale hard and pointed like a cock's spur the sides are speckled with yellowish brown and black. two roes of black spots on lite yellow ground pass throughout his whole length on the upper points of the scuta of the belly and tale 1/2 Inch apart this snake is vulgarly called the cow or bull snake from a bellowing nois which it is said sometimes to make resembling that animal tho' as to this fact I am unable to attest it myself." (Thwaites, Vol. VI, p. 124.)

Sergeant Charles Floyd, Blair, Nebraska, August 5, 1804.

"a verry large Snake was Killed to day Called the Bull Snake his Colure Something like a Rattel Snake..." (Thwaites, Vol. VI, p. 24.)

Meriwether Lewis, Bonhamme County, South Dakota, September 5, 1804.

"This day one of our hunters brought us a Serpent beautifully variegated with small black spotts of a romboydal form on a light yellow white ground. the black predominate most of the back the whiteish yellow on the sides, and it is nearly white on the belly with a few partly couloured scuta in which the black shews but imperfectly and the colouring matter seems to be underneath the Scuta, it is not poisonous it hisses remarkably loud; it has 221 Scuta on the belly and 51 on the Tale, the eyes are of a dark black colour the tale terminates in a sharp point like the substance of a cock's spur. Length 4F 6I." (Thwaites, Vol. VI, p. 128.)

Meriwether Lewis, Upper Kooskoose, Idaho, May 16, 1806.

"I killed a snake near our camp, it is 3 feet 11 Inches in Length, is much the colour of the rattlesnake common to the middle atlantic states, it has no poisonous teeth. it has 218 scutae on the abdomen and fifty nine squmae or half formed scutae on the tail. the eye is of moderate size, the iris of a dark yellowish brown and purple black. there is nothing remarkable in the form of the head which is not so wide across the jaws as those of the poisonous clas of snakes usually are. I preserved the skin of this snake." (Thwaites, Vol. V, p. 42.)

William Clark, Upper Kooskooske, Idaho, May 16, 1806.

"a snake which resembles the rattle snake in colour and spots on the skin, larger and inosent." (Thwaites, Vol. V, p. 43.)

The descriptions given above are undoubtedly of Pituophis melanoleucus, the bullsnake or gopher snake. It is an ubiquitous species of snake in the West, especially appearing in the grasslands and open brushlands, extending as far east as the Mississippi Valley. Because of its coloration, it is often mistaken for the rattlesnake, a fact Lewis mentioned in several places. Perhaps this accounts for his careful inspection of the snake for poisonous teeth.

There are two subspecies of P. melanoleucus that Lewis and Clark encountered. Those gopher snakes described from the Montana, Wyoming and Dakota region were P. m. sayi (bullsnake); those in Idaho and Oregon were P. m. deserticola (Great Basin gopher snake). While there are no direct references to the gopher snake in western Oregon, the subspecies in this area is P. m. catenifer (Pacific gopher snake).

13. Thamnophis elegans vagrans, wandering garter snake.

Meriwether Lewis, Three Forks, Montana, July 24, 1805.

"we observed a great number of snakes about the water...speckled on the bottom and striped with black and brownish yellow on the back and sides...much like the garter snake of our country and about its size ...they all appear to be fond of the water." (Thwaites, Vol. II, p. 266.)

From the description Lewis offered concerning the coloration and habitat and from the location of this snake near Three Forks, Montana, this species can most accurately be identified as Thamnophis elegans vagrans. Distinguishing characteristics include the speckling on the venter and the prominent mid-dorsal stripe extending the length of the body accompanied by lateral striping. In addition, a common trait of the wandering garter snake is to enter water, if it is available, when frightened. This behavior could account for Lewis's observation that the snakes "appear to be fond of the water."

Cutright (1969, p. 429) identifies this snake as Thamnophis ordinoides. While Lewis and Clark probably observed T. ordinoides on some part of their exploration, they were not making reference to this snake in the journal entry from Montana. T. ordinoides is restricted to the Northwest coast.

14. Thamnophis sirtalis, common garter snake.

Meriwether Lewis, Deer Island in Columbia River, Oregon, March 28, 1806.

"we saw a great number of snakes on this island; they were about the size and much the form of the common garter snake of the Atlantic coast and like that snake are not poisonous. they have 160 scuta on the abdomen and 71 on the tail. the abdomen near the head, and jaws are high as the eyes, are of a bluish white, which as it recedes from the head becomes of a dark brown. the field of the back and sides is black. a narrow stripe of a light yellow runs along the center of the back, on each side of this stripe there is a range of small transverse oblong spots of a pale brick red which gradually diminish as they recede from the head and disappear at the commencement of the tail. the purple of the eye is black, with a narrow ring of white bordering it's edge; the ballance of the iris is of a dark yellowish brown." (Thwaites, Vol. IV, p. 211.)

Lewis's description of this snake is one of the most detailed observations conducted by any member of the expedition concerning reptiles. Without a doubt, his notes enable this snake to be positively identified as Thamnophis sirtalis (subspecies concinnus). The distinguishing characteristic of T. sirtalis is the "pale brick red" coloring on the side of the snake. Due to this coloration, the snake is commonly referred to as the red-sided garter snake.

15-16. Thamnophis spp., other garter snakes.

Meriwether Lewis, Sauvies Island in Columbia River, Oregon, March 29, 1806.

"the garter snakes are innumerable and are seen entwined arround each other in large bundles of forty or fifty lying about in different directions through the prairies." (Thwaites, Vol. IV, p. 214.)

From this and other passages referring to the prevalence of garter snakes, it is highly likely that two other species, Thamnophis elegans and Thamnophis ordinoides, were also sighted in the Oregon territory. Both species are widely distributed in western Oregon.

17. Crotalus viridis oreganus, Northern Pacific rattlesnake.

Meriwether Lewis, Arlington, Oregon, April 25, 1806.

"several rattlesnakes killed by the party, they are the same common to the U. States." (Thwaites, Vol. IV, p. 323.)

Meriwether Lewis, Walla Walla, Washington, May 30, 1806.

"The reptiles which I have observed in this quarter are the Rattlesnake of the species discribed on the Missouri. they are abundant in every part of the country and are the only poisonous snake which we have yet met with since we left St. Louis." (Thwaites, Vol. V, p. 86.)

Crotalus viridis oreganus is the subspecies of rattlesnake found in the Columbia River area of Oregon with the range stretching into the region where Oregon, Washington and Idaho meet. These two references represent two of the more extended journal entries regarding the rattlesnake. The journals contain many accounts of rattlesnake sightings, captures and kills.

18. Crotalus viridis viridis, prairie rattlesnake.

Meriwether Lewis, Yellowstone region (Montana-Wyoming), May 17, 1805.

"Capt. Clark narrowly escaped being bitten by a rattlesnake in the course of his walk...this snake is smaller than those common to the middle Atlantic States, bieng about 2 feet 6 inches long; it is of a yellowish brown colour on the back and sides, variegated with one row of oval spots of a brown colour lying transversely over the back from the neck to the tail, and two other rows of small circular spots of the same colour which garnish the sides along the edge of the scuta. it's bely contains 126 scuta on the belly and 17 on the tale." (Thwaites, Vol. II, p. 41-42.)

Meriwether Lewis, Maries River, Montana, June 15, 1805.

"when I awoke from my sleep today I found a large rattlesnake coiled on the leaning trunk of a tree under the shade of which I had been lying at a distance of about ten feet from him. I killed the snake and found that he had 176 scuta on the abdomen and 17 half formed scuta on the tale; it was of the same kinde which I had frequently seen before; they do not differ in their colours from the rattle-snake common to the middle atlantic states, but considerable in the form and figures of those colours."

Meriwether Lewis, Yellowstone region (Montana-Wyoming), August 4, 1806.

"during our halt we killed a very large rattlesnake of the speceis common to our country. it had 176 scutae on the abdomen and 25 on the tail, it's length 5 feet. the scutae on the tail half formed." (Thwaites, Vol. V, p. 234.)

The rattlesnakes mentioned in these selections have been identified from the locations that Lewis cited in his journals and from the present ranges of the subspecies. Crotalus viridis viridis frequents most of Montana and Wyoming.

Admittedly, while some of the species identifications made in this study have been conjectural or have been based upon fairly sketchy evidence from the journals, the intent in this account has been to re-examine the details provided by Lewis and Clark in an effort to give a more accurate description of the reptile and amphibian forms encountered by the two explorers than has heretofore been provided.

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A Technique for the Collection of Serological and Chromosomal Material from Small Reptiles

In recent years, biochemical and chromosomal methods of taxonomic analysis have been employed with increasing frequency by herpetologists. The need for these additional criteria for evaluating phylogenetic relationships is particularly critical in herpetology, since in this field traditional morphometrics have often proved inadequate for the solution of many taxonomic problems.

Many techniques for the collection of serological and chromosomal material from reptiles have been employed, but most require extensive mutilation of the specimen, limiting its use in subsequent morphological analysis. Voucher specimens so damaged often are not deposited in museum collections, with the result that their identity may become debatable in future taxonomic studies.

The basal mitotic index in most reptilian tissues is low, and in order to obtain sufficient mitotic figures, previous workers have collected cells from a variety of tissues, e.g., spleen, intestine, gonad, lung, kidney and bone marrow (Bezy, 1972; Singh, 1972; King and Rofe, 1976; Paull, et al., 1976). Others (Cole and Leavens, 1971) have attempted to stress the organism, using a variety of agents, e.g., intraperitoneal injections of active yeast cultures, in order to induce increased mitotic figures in the bone marrow. However, this technique may produce erratic results (Bezy, et al., 1977; and personal experience) in addition to increased mortality.

A more satisfactory approach has been to induce peripheral leucocyte division following mitogenic stimulation. This need not involve costly 'in vitro' culturing of blood, and Baker et al. (1971, 1972) have successfully induced peripheral leucocyte division in vivo following intraperitoneal injections of phytohemagglutinin (PHA). The technique described here derives from that employed by Baker et al. (1971) with a number of modifications, most notably the handling of much smaller quantities of material.

PROCEDURE

1) Restrain the specimen and inject i.p. with a solution of phytohemagglutinin-P (Difco Ltd.) at a dosage of 26.4 µg per g bodyweight.

2) 24 hours later, repeat Step 1.

3) 72 hours after the first injection, the specimen is injected i.p. with either colchicine (0.05° solution, 0.01 ml per g. bodyweight) or Velban (0.025° solution, 0.005 ml per g. bodyweight).

4) Sacrifice specimen using diethyl ether or Halothane.

5) The heart is exposed by a small longitudinal ventral incision, the dorsal aorta cut, and blood collected by capillary action into heparinised micro-hematocrit tubes (1 mm diameter).

6) One end of the hematocrit tube is sealed with plastacine and the tube spun for 2 minutes in an MSE Micro-hematocrit centrifuge.

7) During centrifugation, the denser red blood cells sediment faster than the larger leucocytes, which form a 'buffy coat' at the interface of the red blood cells and the plasma. The tubes are cut with a diamond-tipped pen just below the interface of the red blood cells and the 'buffy coat'.

8a) The white cells are dispersed in 1-2 ml. of hypotonic 0.95° sodium citrate for 15 minutes.

b) The plasma is transfered to small tubes and stored frozen at -20°C for future serological analysis.

c) The packed red blood cells are dispersed in phosphate-buffered saline and washed three times.

9a) The swollen leucocytes are gently pelleted at 500 g and fixed by slowly layering 1 ml of fresh Carnoy's fixative (3 parts methanol and 1 part acetic acid) on the cells.

b) The pellet of washed red blood cells is resuspended in a small volume of electrophoresis buffer to which Sapponin (1 mg/ml) has been added in order to lyse the cells.

10a) The fixed leucocytes are gently pelleted at 500 g, resuspended in a small quantity of fixative and either flame-dried or air-dried (if required for banding or scanning electron microscope analysis) onto clean microscope slides soaked in ice-cold 70° ethanol.

b) After centrifugation at 500 g for 10 minutes, the hemoglobin solution is decanted from the pellet of cellular debris and made up to 0.003 M dithiothreitol (DDT, Sigma Chemical Co. London) to inhibit possible polymerization of the hemoglobins. Some hemolysates may be converted to cyanomethemoglobin by adding 0.02 ml each of 0.1 M $K_3Fe(CN)_6$ and 0.1 M of KCN to 2 ml of hemoglobin solution.

Most biochemical techniques currently employed, e.g., immuno-electrophoris, require very small ation and polyacrylamide gel electrophoresis, require very small amounts of material, and using the technique outlined above, reptiles weighing under 2 g, including southern African species of Lygodactylus and Leptotyphlops, have been successfully karyotyped, and plasma and hemoglobin collected for serological analysis.

The use of complete in vivo treatment allows the procedure to be easily adapted for field studies, the main remaining difficulty being centrifugation. This is desirable as it increases the ratio of mitotic figures to contaminating red blood cells. As reptilian red blood cells are nucleated and stain with Giemsa, it is often tedious finding suitable mitotic figures in a 'sea' of red blood cells. Leucocytes sediment slower than red blood cells in unspun hematocrit tubes; however, centrifuge speeds necessary for sedimentation are relatively low and can even be achieved with small, hand-cranked, portable models.

Species differences in the optimal time of response to PHA stimulation of peripheral leucocytes may be a complicating factor. Thus, Taylor and Bolanos (1975) observed maximum mitotic figures within a day of PHA treatment in Bothrops atrox and B. nasuta, but only after 3 and 4 days respectively in the congeners B. picadoi and B. godmani. Where the optimal period of PHA treatment cannot be determined by trial due to the availability of only a single or few specimens of a rare species, then small samples of blood can be collected on consecutive days, either from the tip of a snake's tail (Dessauer, 1970), or from the orbital sinuses of lizards (MacLean, et al., 1973). This blood can then be cultured for a short period (4-6 hr) in the presence of either colchicine or Velban, without the need for aseptic conditions. In fact, rare, desirable species may be karyotyped without sacrifice, as has been done with the endangered bog turtle, Clemmys muhlenbergi (Bickham, 1975).

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Two Black Rat Snakes From One Egg

On 25 June 1977, a 50 inch (1270 mm) female Black Rat Snake (Elaphe obsoleta) was caught in Cuivre River State Park, Lincoln County, Missouri. During the early morning of 28 June, she laid eight eggs, ranging in length from 48 to 56 mm, in width from 24 to 26 mm, and averaging 51 x 25 mm.

The first hatchling appeared on 19 September. On 20 September, three more eggs were slit, and from one of these eggs two snakes stuck their heads out (see Fig. 1). Later that evening, I slit the egg a little farther and two completely separate snakes emerged. These two snakes



measured 250 and 255 mm, compared to the other seven hatchlings (the last snake hatched on 23 September), which ranged in size from 290 to 340 mm, and averaged 311 mm in length.

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Notes on Three Species of Micrurus (Serpentes: Elapidae) from Mexico

During an expedition to southeastern Mexico (Summer, 1976), we collected 8 specimens of coral snakes representing three species. Since little information is available on habitats, activity periods and food items, the following data are provided.

Four specimens of Micrurus diastema were collected on roads at night in southern Quintana Roo, Mexico. Two specimens (Louisiana St. Univ. Mus. Zool. LSUMZ 33359-60) were found 16.1 km W Bacalar on 28 and 30 June 1976 at 2200-2400 hrs. A third specimen (LSUMZ 33361) was found 32.2 km N Bacalar on 1 July 1976 at 2300 hrs, and a fourth specimen (LSUMZ 33362) from 24.1 km N Bacalar on 8 July 1976 at 2300 hrs. Three of the snakes were found active on the road, and one DOR. Heavy rains had occurred from 23 to 28 June and had caused local flooding, leaving standing water in the surrounding area. Habitat is a mixture of hardwood forest, scrub forest and tall grasses. One specimen (LSUMZ 33359) contained two adult Eumeces schwartzi. The state of digestion of the two lizards indicated that one had been eaten very recently while the other had probably been ingested within a couple of hours.

Two specimens (LSUMZ 33363-64) of Micrurus diastema were also collected on the road at night at 2200-2400 hrs. on 5 July 1976 in northern Quintana Roo, 3.2 km N and 19.3 km N Playa del Carmen. The surrounding area is a mixture of deciduous trees, palms and grasses. No heavy rains had occurred in this area.

A specimen of Micrurus elegans veraepacis (LSUMZ 33366) was collected 13 June 1976 at Cascadas de Mizola, 21 km S Palenque, Chiapas (ele. 250 m). This adult female was crawling among the moist leaf litter at dusk in the rain forest.

A specimen of Micrurus browni (LSUMZ 33365) was collected 16 July 1976 at 8 km N Soyalo, Chiapas (ele. 2000 m). The snake was found on the road at 1700 hrs. Surrounding area was a deforested hillside with some conifer and deciduous trees. The coral snake had eaten two Adelphicos quadrivirgatus. One of these snakes had been eaten very recently while the other snake had probably been ingested a couple of hours earlier.

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Observations on an Audio-Visual "Warning" Signal in the Pigmy Rattlesnake, Sistrurus miliarius (Reptilia, Serpentes, Crotalidae)

The cottonmouth, Agkistrodon piscivorus, predominantly utilizes a visual threat display by opening its mouth and revealing a white interior that probably serves as an effective warning device at close range (Burkett, 1966). Klauber (1972) presents strong arguments supporting the theory that the rattle of a rattlesnake serves to warn away potential predators. He also mentions that other warning mechanisms are employed in conjunction with the rattle including the hiss, use of the tongue, scent glands, and body posture.

During mid-March of 1975, while on the pine flatwoods of South Carolina, a dusky pigmy rattlesnake (Sistrurus miliarius barbouri) bobbed its head vertically and rattled in response to my approach. This same phenomenon was observed in mid-March of 1976 in the same region. In both instances, movement of the head first attracted my attention before the faintly audible sound of the rattle. Observations in the laboratory were conducted during July 1977 on a female of the above species, and on a male S. m. miliarius (Carolina pigmy rattlesnake). Both snakes were housed separately. I moved in close proximity to a cage and made rapid, threatening movements towards a snake. No tactile stimuli were offered. Both snakes responded by head bobbing and rattling. Observations conducted in the same manner during March 1976 on recently captured male and female S. m. barbouri showed the same behaviors.

Head bobbing in snakes was reported relatively early in the literature (Corrington, 1929) and has since been felt to be a common behavior for the majority of male and female North American snakes (Neill, 1949) that serves as a sign of annoyance (Burkett, 1966; Munro, 1950), but is mainly concerned with reproduction (Munro, 1950; Neill, 1949). I feel that this behavior, in conjunction with rattling, greatly enhances the warning display of S. miliarius. These actions provide subtle visual and audio signals that can function to warn different predators with different propensities towards either component of the

signal. Since the signal is subtle, it can serve to warn predators at close range without attracting the attention of animals farther away.

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The Status of Suppressed Names and of Callopsis Gray (Reptilia: Testudines)

One of the most secure routes to nomenclatural stability is for placement of questionable names on the appropriate "Official List" by the International Commission on Zoological Nomenclature (ICZN); and conversely, it may be concluded that an equally secure route to nomenclatural elimination is for the ICZN to place questionable names on the appropriate "Official Index." Although the latter is true so far as actual use of any given name as valid is concerned, such names can serve almost any other nomenclatural roles, unless specifically excluded from them.

A case in point is the generic name of the neotropical semiterrestrial emydine turtles, in recent years commonly referred to as Rhinoclemys Gray, 1863 (McDowell, 1964), although the last review of turtles of the world (Wermuth and Mertens, 1977: 29-33) places them subgenerically as Geoemyda (Rhinoclemmys), citing Fitzinger (1835) as author. However, Smith, Smith and Sawin (1976) argued that Gray's Rhinoclemys, 1863, is an objective synonym of Rhinoclemmys Fitzinger, 1835, intended (or at least created) merely as an emendation thereof. That view is apparently fully justified, with the concurrence of Wermuth and Mertens (1977: 28) and Fretey, et al. (1977: 64).

However, the same authors (Smith et. al.) also regarded Rhinoclemmys Fitzinger as either undesirable or unavailable for the genus (as did McDowell), because, of the two species cited by Fitzinger, one (Clemmys orbignyi Dumeril) belongs to the genus known as Pseudemys Gray, 1855 (Or Chrysemys Gray, 1844, depending upon whether the latter two groups are regarded as congeneric, but in either case antedated by Rhinoclemmys Fitzinger, 1835), and the second (Clemmys dorsata, Wagler, 1830 = Testudo dorsata Schoepff, 1801, a senior synonym of Testudo punctularia Daudin), is not only a nomen oblitum (never having been used as a valid name since Fitzinger's time) but was suppressed by Opinion 660 of the ICZN. Obviously, it would not be in the interest of nomenclatural stability to replace Pseudemys (or Chrysemys) with Rhinoclemmys, and the alternative of its use for neotropical "Geoemyda," as previously envisioned, seemed precluded by the nomenclatural inadmissability of dorsata.

The problem was actually partially resolved, as later pointed out by Fretey, et al. (1977: 64) by explicit selection by Lindholm (1929: 282-283) of "Emys dorsata Schweigger, 1812" (= Testudo dorsata Schoepff, 1801), a name cited by Fitzinger, as the type of species for Rhinoclemmys, thus eliminating the hazard to Pseudemys (or Chrysemys). Lindholm's action did not alter the situation relative to the availability of Rhinoclemmys, except to leave it dependent entirely upon a name-- dorsata --presumably nonfunctional nomenclaturally (except in cases of homonymy). Thus excluded from nomenclatural use, Rhinoclemmys should be succeeded by the next earliest available name, to wit Callopsis. At least so reasoned Smith, et al. (1976) and no doubt McDowell (1964).

However, Fretey, et al. (1977), acting upon their own analysis of the situation and the counsel of their colleagues Holthuis and Dupuis (both Commissioners), declared that mere suppression or non-use, or both, of a name does not prevent its service as type of a genus, and recognized Rhinoclemmys Fitzinger as the proper name in the present case.

Actually the Code and Official Indices give no explicit statement relative to the nomenclatural role the suppressed names may properly play. Accordingly, an inquiry was directed to the Secretary, Dr. Richard V. Melville, of the ICZN, seeking clarification of the point. He confirmed the validity of the view expressed by Fretey, et al.: a suppressed name, even if also a nomen oblitum of however great an antiquity, can still serve as the type-species of a genus, so long as it is available (and therefore occupied), the ICZN has not explicitly contraindicated, and presumably, it is identifiable (therefore not a nomen dubium). That concept, if upheld, should be incorporated in the Code, and not left to judgment.

Therefore the correct name for the genus to which Testudo dorsata Schoepff (and its validated junior synonym Testudo punctularia Daudin) belong is Rhinoclemmys Fitzinger, 1835. The species and subspecies currently recognized are:

1. Rhinoclemmys annulata (Gray), 1860
2. Rhinoclemmys areolata (Dumeril, Bibron and Dumeril), 1851
3. Rhinoclemmys funerea (Cope), 1876
4. Rhinoclemmys pulcherrima (Gray), 1855
   a. Rhinoclemmys pulcherrima pulcherrima (Gray), 1855
   b. Rhinoclemmys pulcherrima incisa (Bocourt), 1868
   c. Rhinoclemmys pulcherrima manni (Dunn), 1930
5. Rhinoclemmys punctularia (Daudin), 1802
   a. Rhinoclemmys punctularia punctularia (Daudin), 1802
   b. Rhinoclemmys punctularia diademata (Mertens), 1954
   c. Rhinoclemmys punctularia melanosterna (Gray), 1861
   d. Rhinoclemmys punctularia nasuta (Boulenger), 1902
6. Rhinoclemmys rubida (Cope), 1870
   a. Rhinoclemmys rubida rubida (Cope), 1870
   b. Rhinoclemmys rubida perixantha (Mosimann and Rabb), 1953

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Feral Dog Predation of the Gopher Tortoise, Gopherus polyphemus (Reptilia, Testudines, Testudinidae) in Southeast Alabama

Between March 1972 and September 1974, free-ranging dogs (Canis familiaris) were captured in several areas of southeast Alabama and fitted with radio instrumented collars. Periodic monitoring of these dogs using telemetric devices allowed us to determine that at least 94 (86%) were feral or "wild" dogs. The primary study area was on the Fort Rucker Military Reservation in Dale and Coffee counties.

While investigating the predatory activities of these feral dogs, we encountered many burrows of the gopher tortoise Gopherus polyphemus that had been excavated, both partially and completely, apparently by one or more dogs. Though not specifically searching for excavated burrows, we identified 19 that appeared completely destroyed by feral dogs between March 1972 and November 1973. Initially, we assumed that feral dogs were seeking animals other than tortoises that might have sought refuge in the burrows. It is known that a variety of animals, including skunks, opossums, foxes, snakes, and insects use gopher tortoise burrows for dens and convenient retreats (Mount, 1975). Carr (1952) mentions animals seeking shelter in gopher tortoise burrows to escape pursuing dogs.

Several den sites of feral dogs had cracked and chewed bones and shell fragments of gopher tortoises nearby. On the morning of 5 August 1973, a pack of six feral dogs was approached after it had returned from an all-night hunting foray. They were growling, barking, and snapping in a loud, raucous manner and were so preoccupied with their activity that they allowed one of us to approach very closely. These dogs had captured an adult gopher tortoise (carapace length ca. 30 cm). Repeatedly, the tortoise was vigorously tossed into the air and allowed to fall to the ground. At this time a very large (approximately 30 kg) black and tan hound seized the tortoise and fractured the plastron and bridge, producing a loud cracking sound. One of the dogs sensed the presence of the observer, gave a sharp alarm bark, and the pack retreated. Examination of the tortoise revealed that the shell was cracked in such a manner that little effort was required to completely expose the viscera.

About 3 m away was a freshly excavated tortoise burrow about 1 m deep, presumed to have been that of the captured tortoise. Presumably, dogs could dig out tortoises from the bottoms of burrows of the average depth reported by Hansen (1963) only with considerable difficulty. However, gopher tortoises in shallow burrows and those caught away from their burrows probably are susceptible to considerable feral dog predation, since 57 feral dogs were identified in the same general area where tortoise burrows had been destroyed. Based on the size of the area occupied by these dogs, we projected the total feral dog population on the 24,000-ha military reservation to be 308 animals.

The gopher tortoise is a resident of the Lower Coastal Plain of Alabama (Mount, 1975) and is fairly common on Fort Rucker Military Reservation. This species was recently listed among "threatened" plants and animals of Alabama (Mount, 1976). The southeastern section of The Wildlife Society considers the gopher tortoise a "threatened" species. Mount (1976) stated "despite the relative abundance of gophers in some parts of the range, the species is declining markedly in overall numbers."

Predation on adult gopher tortoises, other than by man, is reportedly low (Mount, 1976; Ernst and Barbour, 1972; Douglass and Winegarner, 1977); however, Auffenberg and Weaver (1969) said that coyotes seem to predatorize adult G. ber-

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landieri. Our observations suggest that predation on gopher tortoises by some feral dog packs is significant. Feral dogs would certainly seem to be prime predators of young tortoises as well as of the nests. Further investigations of the problem are warranted.

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Herpetological Husbandry

PHOTOPERIOD AND REPTILE REPRODUCTION

INTRODUCTION

As more emphasis is placed on captive reproduction of reptiles, various factors influencing reproductive potential have been considered. At first, reptiles were kept healthy and well fed in relatively constant environments. Emphasis was on quality of diet and optimum temperature. Sex determining techniques made many aware that sex ratios including members of both sexes had to be accurately determined. Spatial requirements were given consideration and larger quarters were provided for groups of smaller animals. Quality of lighting was improved using various sources of ultraviolet radiation.

All these factors have some influence on various types of animals and their reproductive cycles. There are many environmental factors of greater or lesser significance which are now being considered. "Seasonal fluctuation in length of day - an astronomical component of geographical climate - is an important factor in determining the distribution and adaptations of organisms. The timing of seasonal biological events...may depend on the length of day, instead of the more obvious seasonal change in temperature" (Bates, 1961). "The breeding season of reptiles is primarily affected by temperature conditions and photoperiod" (Porter, K. R., 1972).

Photoperiod, by definition, is the length of time each day during which an animal is exposed to light. The effects of exposure can be negligible or severe depending on wavelength (color), intensity, changes in either of these, length of exposure time, sensory apparatus of the animal, and probably several conditions as yet unknown. Studies have shown that one of these effects can be an increase in gonadal size and hormonal activity (Aronson, 1965). Therefore, photoperiod control is being considered as another factor which might increase reproductive potential in captive animals, particularly reptiles.

Not all species, not all individuals, will respond to photoperiod control in the same way. "The importance of photoperiod seemingly varies considerably from species to species even outside of the tropics" (Porter, 1972). Obviously, animals which spend daylight hours underground and only come out after dark are not going to have the same response as those which emerge with the first rays of the sun and retire at dusk. Some species are crepuscular, emerging during daylight, but only early morning and late evening. Some regulate their temperatures by alternatively hiding and emerging. Some spend much of their lives on the dark forest floor or underground. Some species are sensitive to minute changes in light level while others can hardly see at all. Some forms even have photoreceptors sensitive to wavelengths of light which we can only detect with sophisticated equipment.

Another factor which may be difficult to control is rapidity of change. Most mechanical light controls turn on or off instantaneously while natural light goes through subtle color changes correlated with temperature, wind, and barometric changes each morning and evening and also during storms and other meteorological phenomena. All the complex factors influencing reproduction will probably never be understood or controlled for every species, but systematic advances will add more species to the growing list of those being bred in captivity now.

In an effort to present a starting point for photoperiod research, the following tables have been compiled. Using the formula, it is possible to determine with reasonable accuracy the average length of day for any latitude on any given week. Using the basic solar day, an annual photoperiod cycle can be set up approximating that of the locality of origin for a given animal. It is hoped that this will lead to experiments which will refine our theories adding more knowledge which will cycle back until working systems allow us to breed new species.

FORMULA

Astronomers have been interested in day length ever since the first star gazer noticed that he could see more stars at night than during the day. Therefore, it was logical to turn to astronomy for information on photoperiod. Astronomers determine hours of daylight at any latitude on any given week by using the formula:

$$H = 2/15 \arccos(-\tan L \tan D)$$ [1]

where D is the apparent declination of the sun for a given week as presented in the solar ephemeris (U.S. Gov't, 1076) (see chart #1) and L is the latitude in positive (+) (north of the equator) or negative (-) (south of the equator) decimal degrees. H is the decimal hours of sunlight at the latitude on the given week (converted into hours and minutes in the programs and charts).

HP-25 PROGRAM Name=Photoperiod

01	rel 1	13	+
02	f pause	14	f h.ms
03	f tan	15	f pause
04	chs	16	f pause
05	rcl 2	17	f pause
06	f tan	18	rcl 4
07	X	19	sto+1
08	g $\cos^{-1}$	20	rcl 3
09	2	21	rcl 1
10	X	22	f x=y
11	1	23	gto 00
12	5	24	gto 01

NOTES:
R_1 = latitude (L)
R_2 = apparent declination (D)
R_3 = upper limit (50%)
R_4 = increment (2.5%)

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Without the encouragement of Joseph Laszlo, San Antonio Zoological Gardens and the expert assistance of Ronald F. Dilulio, Fort

[1] Kelsey, Hoff & Neff, 1974.

Worth Museum of Science and History and Joe Britton, Department of Biology, Texas Christian University, this paper would not have been written.

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TABLE 1.

Instructions

This table is extrapolated from the ephemeris[2] which, in its originally published form, gives the declination every three days and in degrees, minutes and decimal minutes. It was felt that for our purposes, one photoperiodic change per week should be sufficient and the formula calls for the declination in decimal degrees. Anyone wishing to compute the photoperiod for a given latitude during the year will find this table necessary.

Annual Apparent Solar Declination (D)

Month	Day	D
January	1	-23.0867
January	7	-22.5033
January	13	-21.6567
January	22	-19.9183
February	3	-16.8333
February	12	-14.0467
February	18	-12.0117
February	24	- 9.8583
March	4	- 6.4700
March	10	- 4.1383
March	16	- 1.7750
March	31	1.7767
April	6	6.4183
April	15	9.7333
April	21	11.8267
April	27	13.8050
May	6	16.5100
May	12	18.1117
May	18	19.5300
May	27	21.2800
June	2	22.1750
June	8	22.8367
June	17	23.3783
June	23	23.4300
June	29	23.2350
July	8	22.4867
July	14	21.6950
July	20	20.6800
July	29	18.7733
August	4	17.2667
August	10	15.5933
August	19	12.8067
August	25	10.7933
September	9	5.3533
September	15	3.0650
September	21	0.7433
September	30	- 2.7617
October	6	- 5.0800
October	12	- 7.3617
October	21	-10.6633
October	27	-12.7500
November	2	-14.7183
November	11	-17.3950
November	17	-18.9600
November	23	-20.3233
December	2	-21.9417
December	8	-22.7067
December	14	-23.2067
December	23	-23.4333

[2] U.S. Gov't, 1976.

TABLE 2. Northern and southern limit of reptile range within countries.

A good world atlas will give the latitude of any desired geographical location; so, knowing the range of a particular animal, the latitude and hence the photoperiod can be computed with or without this table.

COUNTRY	LATITUDE °North	LATITUDE °South
Canada	66	44
U.S. (contiguous)	50	25
Mexico	30	15
Central America	18	08
West Indies	32	10
Argentina	-22	-54
Bolivia	-16	-19
Brazil	00	-30
Chile	-18	-53
Colombia	10	00
Ecuador	00	-03
French Guiana	05	05
Guyana	07	03
Paraguay	-20	-25
Peru	-03	-17
Surinam	06	06
Uruguay	-30	-34
Venezuela	11	04
Galapagos Islands	00	00
France	50	41
Germany	54	48
Spain	42	36
Italy	45	38
United Kingdom	58	50
U.S.S.R. (European)	59	44
Algeria	37	22
Cameroons	17	03
Congo-Zaire	00	-06
Congo, Rep. of	02	-04
Ethiopa	17	08
Kenya	-01	-04
Libya	33	24
Malagasy	-12	-23
Mozambique	-15	-26
Nigeria	11	06
Rhodesia	-18	-20
South Africa	-23	-34
Sudan	22	08
Tanzania	-05	-08
Uganda	02	00
United Arab Republic	31	24
China	45	23
Hong Kong	22	22
Japan	43	33
Taiwan	25	23
U.S.S.R. (Asian)	59	41
Burma	22	16
Malaya	03	01
Borneo	06	06
Philippines	07	04
Thailand	14	14
Ceylon-Sri Lanka	07	07
India	28	13
Iraq	36	30
Israel	32	32
West Pakistan	33	24
Australia	-10	-38
New Zealand	-37	-45
Hawaii	21	21
New Guinea	-04	-10
Fiji	-18	-18
Solomon Islands	-09	-09

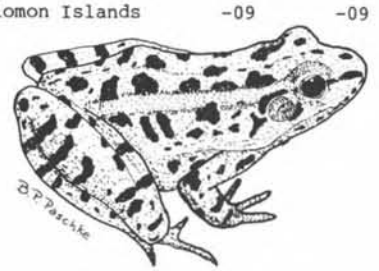


TABLE 3.

INSTRUCTIONS

The photoperiod (day length) in hours and minutes of any latitude from 50° South to 50° North can be found by locating the nearest latitude in the row across the top and reading the weekly changes down the column.

Table 3 begins on the opposite page.

J. P. JONES, Herpetarium Supervisor, Fort Worth Zoological Park, Fort Worth, Texas 76110.

LATITUDE	>-50.0	-47.5	-45.0	-42.5	-40.0	-37.5	-35.0	-32.5	-30.0
JAN 1	16: 4	15: 41	15: 21	15: 3	14: 47	14: 32	14: 18	14: 6	13: 53
JAN 7	15: 56	15: 35	15: 15	14: 58	14: 42	14: 28	14: 14	14: 2	13: 50
JAN 13	15: 45	15: 25	15: 7	14: 50	14: 35	14: 21	14: 9	13: 57	13: 46
JAN 22	15: 24	15: 6	14: 49	14: 35	14: 21	14: 9	13: 57	13: 46	13: 36
JAN 28	15: 7	14: 51	14: 36	14: 22	14: 10	13: 58	13: 48	13: 38	13: 28
FEB 3	14: 49	14: 34	14: 20	14: 8	13: 57	13: 47	13: 37	13: 28	13: 20
FEB 12	14: 18	14: 6	13: 55	13: 46	13: 36	13: 28	13: 20	13: 13	13: 6
FEB 18	13: 57	13: 47	13: 38	13: 29	13: 22	13: 15	13: 8	13: 2	12: 56
FEB 24	13: 35	13: 27	13: 20	13: 13	13: 7	13: 1	12: 55	12: 50	12: 46
MAR 4	13: 2	12: 56	12: 52	12: 47	12: 43	12: 39	12: 36	12: 33	12: 30
MAR 10	12: 39	12: 36	12: 33	12: 30	12: 27	12: 25	12: 23	12: 21	12: 19
MAR 16	12: 16	12: 15	12: 14	12: 13	12: 11	12: 10	12: 9	12: 9	12: 8
MAR 25	11: 43	11: 44	11: 45	11: 46	11: 48	11: 49	11: 50	11: 50	11: 51
MAR 31	11: 20	11: 23	11: 26	11: 29	11: 32	11: 34	11: 36	11: 38	11: 40
APR 6	10: 58	11: 3	11: 8	11: 12	11: 16	11: 20	11: 23	11: 27	11: 30
APR 15	10: 25	10: 33	10: 40	10: 47	10: 53	10: 59	11: 4	11: 9	11: 14
APR 21	10: 4	10: 14	10: 23	10: 31	10: 39	10: 46	10: 52	10: 58	11: 4
APR 27	9: 43	9: 55	10: 6	10: 15	10: 24	10: 33	10: 40	10: 47	10: 54
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MAY 18	8: 39	8: 57	9: 13	9: 28	9: 41	9: 53	10: 4	10: 15	10: 25
MAY 27	8: 18	8: 38	8: 56	9: 12	9: 27	9: 40	9: 53	10: 5	10: 16
JUN 2	8: 7	8: 28	8: 47	9: 4	9: 20	9: 34	9: 47	9: 59	10: 11
JUN 8	7: 59	8: 21	8: 40	8: 58	9: 14	9: 29	9: 42	9: 55	10: 7
JUN 17	7: 51	8: 14	8: 35	8: 53	9: 9	9: 25	9: 39	9: 52	10: 4
JUN 23	7: 51	8: 14	8: 34	8: 52	9: 9	9: 24	9: 38	9: 51	10: 4
JUN 29	7: 53	8: 16	8: 36	8: 54	9: 11	9: 26	9: 40	9: 53	10: 5
JUL 8	8: 3	8: 25	8: 44	9: 1	9: 17	9: 31	9: 45	9: 57	10: 9
JUL 14	8: 13	8: 34	8: 52	9: 8	9: 23	9: 37	9: 50	10: 2	10: 13
JUL 20	8: 26	8: 45	9: 2	9: 18	9: 32	9: 45	9: 57	10: 8	10: 19
JUL 29	8: 48	9: 5	9: 21	9: 34	9: 47	9: 59	10: 9	10: 19	10: 29
AUG 4	9: 6	9: 21	9: 35	9: 47	9: 59	10: 9	10: 19	10: 28	10: 37
AUG 10	9: 24	9: 38	9: 50	10: 1	10: 11	10: 21	10: 29	10: 38	10: 45
AUG 19	9: 54	10: 5	10: 14	10: 23	10: 32	10: 39	10: 46	10: 53	10: 59
AUG 25	10: 14	10: 23	10: 32	10: 39	10: 46	10: 52	10: 58	11: 4	11: 9
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OCT 6	12: 48	12: 44	12: 40	12: 37	12: 34	12: 31	12: 28	12: 25	12: 23
OCT 12	13: 10	13: 4	12: 59	12: 54	12: 49	12: 45	12: 41	12: 37	12: 34
OCT 21	13: 43	13: 34	13: 26	13: 19	13: 12	13: 6	13: 0	12: 55	12: 49
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NOV 23	15: 29	15: 10	14: 53	14: 38	14: 24	14: 12	14: 0	13: 49	13: 38
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DEC 8	15: 59	15: 37	15: 17	15: 0	14: 44	14: 29	14: 16	14: 3	13: 51
DEC 14	16: 5	15: 43	15: 23	15: 5	14: 48	14: 33	14: 19	14: 6	13: 54
DEC 23	16: 8	15: 45	15: 25	15: 7	14: 50	14: 35	14: 21	14: 8	13: 55

LATITUDE	>-27.5	-25.0	-22.5	-20.0	-17.5	-15.0	-12.5	-10.0	-7.5
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JAN 7	13: 39	13: 29	13: 19	13: 9	13: 0	12: 50	12: 42	12: 33	12: 25
JAN 13	13: 35	13: 25	13: 15	13: 6	12: 57	12: 48	12: 40	12: 32	12: 23
JAN 22	13: 26	13: 17	13: 9	13: 0	12: 52	12: 44	12: 36	12: 29	12: 21
JAN 28	13: 20	13: 11	13: 3	12: 55	12: 48	12: 41	12: 33	12: 27	12: 20
FEB 3	13: 12	13: 4	12: 57	12: 50	12: 43	12: 37	12: 30	12: 24	12: 18
FEB 12	12: 59	12: 53	12: 47	12: 41	12: 36	12: 30	12: 25	12: 20	12: 15
FEB 18	12: 50	12: 45	12: 40	12: 35	12: 30	12: 26	12: 21	12: 17	12: 12
FEB 24	12: 41	12: 37	12: 33	12: 29	12: 25	12: 21	12: 17	12: 14	12: 10
MAR 4	12: 27	12: 24	12: 21	12: 18	12: 16	12: 13	12: 11	12: 9	12: 6
MAR 10	12: 17	12: 15	12: 13	12: 12	12: 10	12: 8	12: 7	12: 5	12: 4
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MAR 25	11: 52	11: 53	11: 54	11: 54	11: 55	11: 56	11: 56	11: 57	11: 58
MAR 31	11: 42	11: 44	11: 46	11: 47	11: 49	11: 51	11: 52	11: 54	11: 55
APR 6	11: 33	11: 35	11: 38	11: 41	11: 43	11: 46	11: 48	11: 50	11: 53
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APR 21	11: 9	11: 15	11: 20	11: 25	11: 29	11: 34	11: 38	11: 43	11: 47
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AUG 25	11: 14	11: 19	11: 23	11: 28	11: 32	11: 36	11: 40	11: 44	11: 48
AUG 31	11: 23	11: 27	11: 31	11: 34	11: 37	11: 41	11: 44	11: 47	11: 50
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DEC 23	13: 44	13: 33	13: 22	13: 12	13: 2	12: 53	12: 44	12: 35	12: 26

LATITUDE >	-5.0	-2.5	0.0	2.5	5.0	7.5	10.0	12.5	15.0
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JAN 13	12: 15	12: 7	11: 59	11: 52	11: 44	11: 36	11: 27	11: 19	11: 11
AN 22	12: 14	12: 7	11: 59	11: 52	11: 45	11: 38	11: 30	11: 23	11: 15
JAN 28	12: 13	12: 6	11: 59	11: 53	11: 46	11: 39	11: 32	11: 26	11: 18
FEB 3	12: 12	12: 6	11: 59	11: 53	11: 47	11: 41	11: 35	11: 29	11: 22
FEB 12	12: 10	12: 5	11: 59	11: 54	11: 49	11: 44	11: 39	11: 34	11: 29
FEB 18	12: 8	12: 4	11: 59	11: 55	11: 51	11: 47	11: 42	11: 38	11: 33
FEB 24	12: 6	12: 3	11: 59	11: 56	11: 53	11: 49	11: 45	11: 42	11: 38
MAR 4	12: 4	12: 2	11: 59	11: 57	11: 55	11: 53	11: 50	11: 48	11: 46
MAR 10	12: 2	12: 1	11: 59	11: 58	11: 57	11: 55	11: 54	11: 52	11: 51
MAR 16	12: 1	12: 0	11: 59	11: 59	11: 58	11: 58	11: 57	11: 56	11: 56
MAR 25	11: 58	11: 59	11: 59	12: 0	12: 1	12: 1	12: 2	12: 3	12: 3
MAR 31	11: 57	11: 58	11: 59	12: 1	12: 2	12: 4	12: 5	12: 7	12: 8
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APR 15	11: 53	11: 56	11: 59	12: 3	12: 6	12: 10	12: 13	12: 17	12: 21
APR 21	11: 51	11: 55	11: 59	12: 4	12: 8	12: 12	12: 16	12: 21	12: 25
APR 27	11: 50	11: 55	11: 59	12: 4	12: 9	12: 14	12: 19	12: 24	12: 30
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MAY 12	11: 46	11: 53	11: 59	12: 6	12: 13	12: 19	12: 26	12: 33	12: 40
MAY 18	11: 45	11: 52	11: 59	12: 7	12: 14	12: 21	12: 28	12: 36	12: 43
MAY 27	11: 44	11: 52	11: 59	12: 7	12: 15	12: 23	12: 31	12: 39	12: 47
JUN 2	11: 43	11: 51	11: 59	12: 8	12: 16	12: 24	12: 32	12: 41	12: 50
N 8 U	11: 43 J	11: 51	11: 59	12: 8	12: 16	12: 25	12: 34	12: 42	12: 51
JUN 17	11: 42	11: 51	11: 59	12: 8	12: 17	12: 26	12: 34	12: 43	12: 53
JUN 23	11: 42	11: 51	11: 59	12: 8	12: 17	12: 26	12: 35	12: 44	12: 53
JUN 29	11: 42	11: 51	11: 59	12: 8	12: 17	12: 25	12: 34	12: 43	12: 52
JUL 8	11: 43	11: 51	11: 59	12: 8	12: 16	12: 24	12: 33	12: 42	12: 50
JUL 14	11: 44	11: 52	11: 59	12: 7	12: 15	12: 24	12: 32	12: 40	12: 48
JUL 20	11: 44	11: 52	11: 59	12: 7	12: 15	12: 22	12: 30	12: 38	12: 46
JUL 29	11: 46	11: 53	11: 59	12: 6	12: 13	12: 20	12: 27	12: 34	12: 41
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AUG 10	11: 48	11: 54	11: 59	12: 5	12: 11	12: 16	12: 22	12: 28	12: 34
AUG 19	11: 50	11: 55	11: 59	12: 4	12: 9	12: 13	12: 18	12: 23	12: 27
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AUG 31	11: 53	11: 56	11: 59	12: 3	12: 6	12: 9	12: 12	12: 15	12: 18
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SEP 30	12: 1	12: 0	11: 59	11: 59	11: 58	11: 57	11: 56	11: 55	11: 54
OCT 6	12: 3	12: 1	11: 59	11: 58	11: 56	11: 54	11: 52	11: 50	11: 49
OCT 12	12: 5	12: 2	11: 59	11: 57	11: 54	11: 52	11: 49	11: 46	11: 44
CT 21	12: 7	12: 3	11: 59	11: 56	11: 52	11: 48	11: 44	11: 40	11: 36
OT 27	12: 9	12: 4	11: 59	11: 55	11: 50	11: 46	11: 41	11: 36	11: 32
NOV 2	12: 10	12: 5	11: 59	11: 54	11: 49	11: 44	11: 38	11: 33	11: 27
NOV 11	12: 12	12: 6	11: 59	11: 53	11: 47	11: 41	11: 34	11: 28	11: 21
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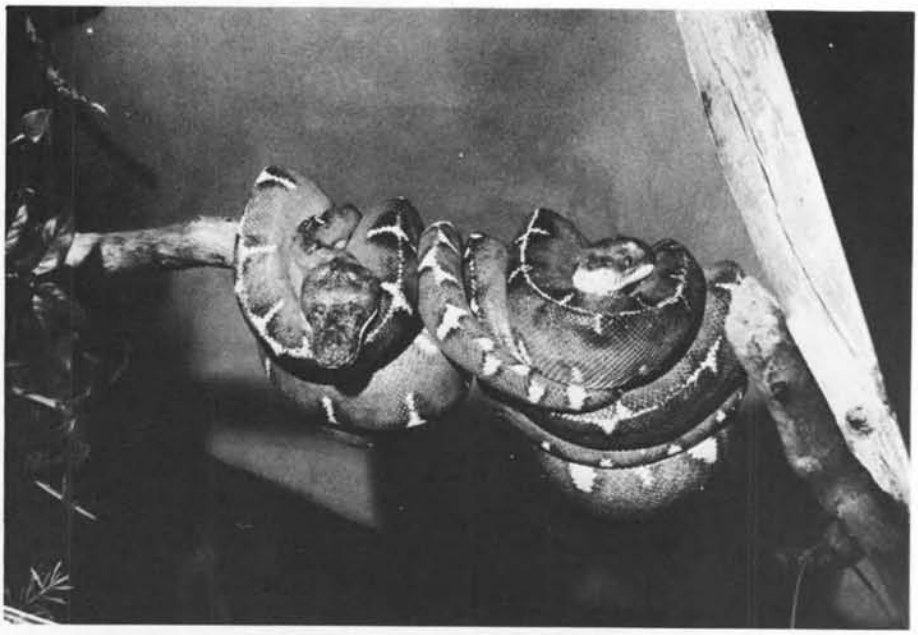
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OBSERVATIONS ON THE REPRODUCTION OF THE EMERALD TREE BOA, CORALLUS CANINUS

The emerald tree boa, Corallus caninus is often exhibited in zoological collections and is indeed much sought-after for display. It is therefore surprising that the reproduction of this species is not well known. Meyer-Holzapfel (1969) reported on a captive female that produced 6 young and 3 undeveloped ova and Fitch (1970) mentioned a large female that contained 10 full termed fetuses. More recently, Murphy, et al., (In press) reported the birth of 10 young from a captive female at the Fort Worth Zoo and described these young as well as their ontogenetic color change. They also described courtship behavior in this species. Reported here are additional observations on the captive reproduction and young of this species.

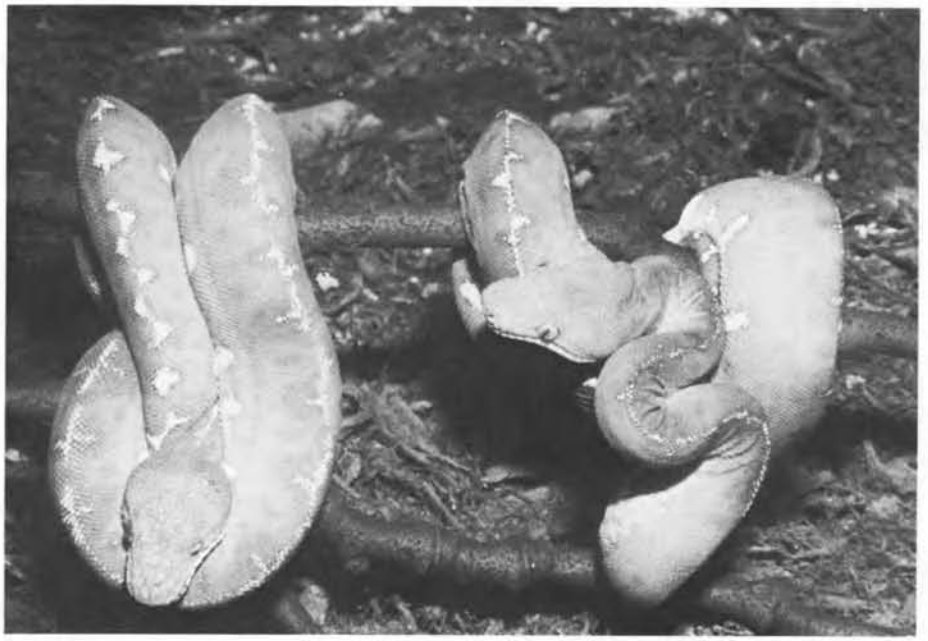


The Philadelphia Zoological Garden received an adult pair of emerald tree boas in July 1973. This pair was kept in quarantine for approximately 30 days, during which time fecal samples were obtained for parasitic examination and regular feeding was established. Following this period, these snakes were moved to a large vertical fiberglass exhibit containing another female emerald tree boa and a pair of green tree pythons, Chondropython viridis, all three of which were later removed for various reasons. The enclosure, measuring 137 x 109 x 239 cm., is decorated with polyethylene vegetation and fiberglass rockwork on one wall. The rockwork forms a small "waterfall" which fills an elevated pool. A large 7.5 m dead tree with many horizontal branches has been provided and contact with this tree by the snakes is always maintained, even when they are soaking in the elevated pool. Several branches are positioned so that they overhang the elevated pool. A licorice root mulch is provided for the substrate. Moisture is added to the enclosure by misting the walls, ceiling, substrate and polyethylene vegetation twice daily (from January to March the exhibit is misted 3 or 4 times daily). These snakes are also soaked in tepid water out of the exhibit once each week to encourage defecation.

Courtship behavior was first noted between this pair in late January 1974 and continued irregularly until early March 1974. Unfortunately, all aspects of this behavior were not observed. However, on several mornings the male was coiled next to the female on one of the horizontal branches near the top of the tree. In this position he was attempting to wrap his tail around the female's tail, which was firmly coiled around the branch and protected by several coils of her body. The only observed copulation occurred on the morning of 4 February 1974, and was similar to the behavior described above (Fig. 1). This behavior differs from that reported by Murphy et al., (In press) in that no exploratory behavior of the female's body by the male's tongue or body, or the use of his spurs were observed.

Although the female fed well, she fasted from 8 May 1974 until after parturition, approximately three and one half months later, without notable weight loss. In May 1974, a slight abdominal swelling was noticed, which increased in bulk and length until 4 August 1974, when it occupied the posterior 1/3 of her body. An increase in water consumption was also noted during this period.

On 7 August 1974, between 0900 and 1030 hr., the female gave birth to 6 living young which averaged 406



mm in total length and had an average weight of 40 g. Four undeveloped ova were also produced. A relatively long umbilical cord was surgically removed from the young shortly after birth. The natal skin was shed within 48 hours of birth.

The young were colored alike, differing considerably from the adult. The top of the head and dorsum were reddish-orange and the lower labials and venter were light yellow. A white vertebral stripe with numerous lateral extensions extended from the neck to the end of the tail. A series of ventrolateral white markings were also present (Fig. 2).

Within three months of birth, two young had died. One had an infected umbilicus and the other died from intestinal atresia. All of the young refused to eat on their own and had to be assisted by gently opening their mouths and placing dead furred mice therein. Several months later, all but one (the smallest) of the remaining young began feeding on their own and assisted feeding was stopped for these specimens.

By December 1974, four months after birth, three of the four remaining young started to develop the emerald green coloration of the adult. The fourth young, the smallest specimen, did not begin color transformation until March 1975. Approximately 1 1/2 to 2 months were required for the color transformation to be completed.

In March 1976, a young captive-bred male emerald tree boa from the Fort Worth Zoo was introduced with our female on exhibit. Although courtship behavior similar to that reported by Murphy et al., (In press) was noted shortly after introduction, no copulations were observed. The female was later removed from exhibit in June 1976 for medical reasons.

During August 1976, an abdominal swelling was again noted in the female, which increased in size and bulk until the end of December 1976, when it occupied the posterior 1/3 of her body. An increase in water consumption was not noted during this period, but this might be due to the fact that the holding facility did not have the observational qualities of the exhibit.

On 2 January 1977, at approximately 1400 hr. the female gave birth to 10 dead and 1 live young, as well as producing 3 undeveloped ova. None of these young were measured or weighed; however, they appeared to be similar in size and coloration to the young produced in 1974.

The single live young was immediately put in a clean, warm gallon jar with damp paper towels to provide an abundance of humidity. This snake was then transferred to a small aquarium after four days when it appeared to have gained some strength. A small horizontal branch was provided for resting purposes. Although this snake was kept in a warm room where humidity is approximately 75 to 80%, a damp paper towel was kept in the cage with the snake to provide additional humidity. The natal skin of this specimen was shed approximately 48 hr. after birth. The long umbilical cord was surgically removed during this 48 hr. period.

This specimen refused to eat on its own and was assisted by placing newborn mice in its mouth, with swallowing occurring voluntarily. This specimen died on 24 March 1977, for unknown causes.

ACKNOWLEDGMENTS

I would like to thank Kevin Bowler and Harry W. Greene for their helpful comments in preparing this manuscript. I would also like to thank James B. Murphy for sending me a copy of his manuscript on reproduction of boas, which is presently in press.

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Book Reviews

TO CATCH A CROCODILE: HUNTING IN PAPUA/NEW GUINEA. By Peter Pinney, 145 pages. Angus and Robertson, London, 1976. $4.00.

The people of Papua/New Guinea's gulf delta area and those inhabiting the borders of the massive Fly and Sepik river systems are traditional consumers of crocodiles. Prior to European contact, these special crocodile-hunting communities enjoyed an ecologically balanced relationship with their wildlife. Then, in the early 1950's, expatriate hunters discovered the enormous potential of New Guinea's crocodile resource and began to compete with the indigenous peoples for their wildlife. Introduced rifles, shotguns, electric torches, gill nets, outboard motors, and assorted hunting paraphernalia were the tools of destruction which crippled Papua/New Guinea's crocodile populations during the twenty-year period that followed.

One of those expatriates who participated in the slaughter was George Craig, a large, tough man who, by his own admission, processed some 29,000 crocodile skins in his salting shed in Daru during fifteen exploitive years. To Catch a Crocodile is the portrayal of Craig's last big hunt on the Fly. Craig embarks from his headquarters on Daru, an island off the south coast of Papua/New Guinea, in his forty-five foot vessel, the Janis B. With his Creole associate, Copian, Peter Pinney (the book's author--smuggler and self-proclaimed conservationist), and several indigent helpers, Craig skillfully navigates his craft on a 500-mile Fly River venture.

The journey leads the group in search of remnant populations of crocodiles in sheltered lagoons and tiny river systems which feed the Fly. Searching for an eterari, a twenty foot monster crocodile, Craig and company violate the traditions of the Mipan River people and enter their forbidden and enchanted Mamoosie Swamp. They pass villages where hollow remnants of humanity have lost their traditions and livelihood in the course of interacting with white crocodile hunters, missionaries, and assorted exploiters. Money is doled out to natives who clamber onto the deck of the Janis B with crocodile hides, to be exchanged later for trinkets from the ship's store.

This, the last hunt, had to be a big one. The crocodile resource was evaporating in the Fly system, and Craig decides to culminate the adventure by leading an expedition to a previously unexploited swamp across the Irian Jaya (Indonesian New Guinea) border. Abandoning common sense and the mother ship, the group sets forth in tiny skiffs on an incredibly arduous westward journey. True to Craig's predictions, they found crocodiles in abundance. Suddenly, before the savage harvest could begin, the alien visitors are discovered. Facing poaching charges at the very least, the group wildly retreats back toward the Fly, followed by a wind-driven inferno set by their pursuers. The author, a talented composer of descriptive passages, summarizes the view behind them, "It was as if the womb of the mighty Fly, the swamps which nourished her, lay bleeding and prostrate from some frightening abortion."

Indeed, To Catch a Crocodile is an authentic and masterfully written book, which provides its readers with insight into the integration of the lives of crocodiles, expatriates, and the exploited indigents of Papua/New Guinea. Unfortunately, the book's hero is typical of the human parasites who ravaged the country's resources and the minds of its inhabitants. It seems enigmatic that the author should attempt to convince his readers that Craig is a sensitive conservationist concerned about the future of Papua/New Guinea's wildlife.

JOHN BEHLER, Curator of Herpetology, New York Zoological Society, Bronx, New York 10460. ●

AMPHIBIANS & REPTILES IN ALASKA, THE YUKON & NORTHWEST TERRITORIES. By Robert Parker Hodge. 1976. Alaska Northwest Publishing Co., Anchorage, Alaska. x + 89 pp., illus. $3.95.

Robert Parker Hodge has produced an appealing regional handbook of herpetofauna. His paper-covered, pocket-sized book is colorful, well-illustrated with both black-and-white and color photographs, line maps and drawings. It is especially aimed at the non-specialist, but I found its text informative and well-written for specialists as well. As more people are visiting and living in the northern part of the continent, it is time for a general, regional handbook of herpetofauna.

Having so few species in the local fauna was an advantage to Hodge, for it allowed him to consider other than the usual subjects included in most treatments of regional faunas. Major subjects are: basic information about amphibians and reptiles, geographical distribution and origin, northern adaptations, mythology, physiography, climate, habitat types, check lists and species accounts, and suggestions for study. Species found in Alaska are treated separately from those found in Yukon and the Northwest Territories. Only one species, the wood frog, is known to occur in both Alaska and also in northern Canada.

Six species of amphibians and one reptile are known to occur in Alaska. Only one species, the wood frog, is widespread, and only three species occur north of the Panhandle. Three species of frogs, two toads, and one snake are known to occur in the poorly-explored Northwest Territories and Yukon. Certainly the list of Tongass Museum specimens is an indiction of how little is known about the distribution of these species. Virtually nothing is known about other aspects of their biology in the North.

An important section of the book explains how these species may have gotten where they are. Hodge's general explanation of continental drift and past climatic changes is clear, and his presentation of the problems of adaptation of ectothermic vertebrates to northern climates is fine. The list of unsolved problems concerning these adaptations is a challenge to students for further research.

I like the section on "Mythology, Religion, and Superstititon." But I wished for more of the centuries-old legends of the Alaskans concerning the role of Frog and Salamander in their totemic religions. The reader is teased by the interesting photographs and references to many legends. It is not clear why warnings concerning problems encountered during collecting and ill-used tact-

ics of politicians should be included in this section.

I found only two typographical errors in the book (Plethodon becomes Phethodon on p. 78 and Brina Kessel becomes Brian on p. 86). Two illustrations lack captions (p. 17, 18). I would have liked references at the ends of appropriate sections, preferably with citations in the text. It is not clear whether the "Reading List" includes all sources for information in the text. There is no taxonomic key for identification; however the fine illustrations and the distinctness of the species makes identification easy from the photographs alone.

Hodge, a six-year resident of Alaska, stresses the need for information about the biology of northern populations. His book should stimulate further sutdy of these special peripheral populations. The call to amateurs to contribute to the scarce information about amphibians and reptiles in the Far North is an important statement. Especially pertinent is the warning that these animals keep poorly in captivity. Except for possibly brief observations on captive animals, amateurs are discouraged from keeping amphibians and reptiles in captivity.

Hodge has produced an attractive, informative, and stimulating book which is an important contribution to the scarce natural history literature about Alaska. Even if the reader never goes to the Far North, he will have gained much by spending an hour or two with "Amphibians & Reptiles in Alaska, the Yukon & Northwest Territories." And the price is right!

MARGARET M. STEWART, Department of Biological Sciences, State University of New York at Albany, Albany, New York 12222. ●

Legislative Alert

LEGISLATIVE NEWS:

Since the last issue, the following rulemaking actions have taken place --

Proposed regulations:

1) The U.S. Fish and Wildlife Service proposed to determine the Key mud turtle (Kinosternon bauri bauri) and the Plymouth red-bellied turtle (Chrysemys rubriventris bangsi) to be Endangered species and to identify Critical Habitat for these species (F.R., Vol. 43, No. 98, 19 May 78). Public comment period closed 18 July 78.

2) The U.S. Fish and Wildlife Service proposed Critical Habitat for the hawksbill sea turtle (Eretmochelys imbricata) in the Commonwealth of Puerto Rico (F.R., Vol. 43, No. 101, 24 May 78). Public comment period closed 23 July 78.

3) The U.S. Fish and Wildlife Service proposed Critical Habitat for the Santa Cruz long-toed salamander (Ambystoma macrodactylum croceum) in California (F.R., Vol. 43, No. 121, 22 June 78). Public comment closed 22 July 78.

Final regulations:

The National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service have determined the loggerhead sea turtle (Caretta caretta) to be a Threatened species. In addition, the green sea turtle (Chelonia mydas including subspecies C. m. agassizii and C. m. carrinegra) and the (olive) Pacific ridley sea turtle (Lepidochelys olivacea) are determined to be Threatened species, except for Florida and Mexican Pacific coast breeding populations of C. mydas and Mexican Pacific coast breeding populations of L. olivacea, which are Endangered species (F.R., Vol. 43, No. 146, 28 July 78). This ruling becomes effective 30 days after publication of the "availability of EPA's impact statement."

NOTICE:

In order to combat complaints by some of our colleagues that they are not receiving adequate notice of U.S. Federal and state legislative actions involving amphibians and reptiles, the SSAR has established the Legislative Alert Committee. Its objective is to rapidly circulate such legislation among U.S. herpetologists, who can then prepare adequate responses to the rulemaking within the required public comment period. The following is a brief description of how this needed information flow should operate--

Federal legislation: contacts in Federal agencies supply the Legislative Alert Committee Chairperson with a copy of the proposed legislation or rulemaking (NOTE: all wildlife legislative actions are published in the Federal Register which is available in any law school library). The chairperson then calls the regional committee representatives (see below for names and addresses) to inform them of the legislation. Each regional rep in turn should contact SSAR state representatives and/or regional societies within his/her region, and each state/regional society representative will then inform the herpetologists in their state/society. As soon as they are available, copies of the legislation are disseminated to herpetologists following the lines described above.

State legislation: state SSAR representatives and/or regional society members are encouraged to inform the committee chairperson of any "herp" legislation or rulemaking within their states. The chairperson then calls the committee's regional reps, who in turn will call the state/regional society representatives (other than the one reporting the legislation originally) who call the herpetologists in the state and/or regional societies. Copies of the state rulemaking are circulated to herpetologists as it becomes available along the lines described for Federal legislation. Herpetologists outside those states proposing legislation need to be informed, as many have knowledge of a species involved.

The SSAR Legislative Alert Committee is composed of the persons listed below; these individuals are responsible for keeping herpetologists informed of legislative actions in those states following their names.

Hugh Quinn, Chairman Curator of Herpetology Houston Zoological Garden P. O. Box 1562 Houston, Texas 77001	TX AR LA
Malvin L. Skaroff 1025 Lakeside Avenue Philadelphia, PA 19126	CT DE ME MA MD NJ NY PA RI VA WV DC VT NH
Norman Scott Department of Biology University of New Mexico Albuquerque, N. M. 87106	AK ID HI OR WA CA NV CO MT WY UT AZ NM
Tom Berger Museum of Natural History University of Kansas Lawrence, Kansas 66045	IA KS MO NB ND SD IL IN MI MN OH WI KY
Howard (Duke) Campbell Gainesville Field Station USDI, F. & W. S. 2820 E. University Avenue Gainesville, FL 32601	AL FL MS GA PR NC SC TN

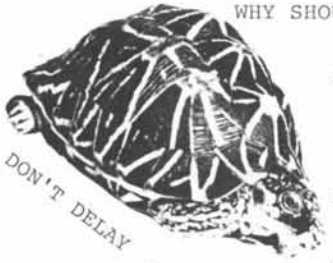
Copies of all letters sent in response to legislative actions should be forwarded to Hugh Quinn.

In order to document the committee's effectiveness over the next year, please let Hugh know if you are not receiving notice of legislative actions prior to seeing it in this column.

THOMAS J. BERGER, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

Regional Society News

CHICAGO HERPETOLOGICAL SOCIETY



WHY SHOULD YOU JOIN THE CHICAGO HERPETOLOGICAL SOCIETY?

Promotion of herpetology to the general public
lectures by members in schools, libraries, etc.
shopping center shows
care in captivity program

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A monthly newsletter

Members handbook

NAME _____

STREET _____

CITY _____

STATE _____ ZIP _____

TELEPHONE _____



Check one:

___Individual - $10.00

___Family - $12.50

___Junior (under 18) - $7.50

___Sustaining - $25.00

___Contributing - $100.00

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CHICAGO HERPETOLOGICAL SOCIETY, 2001 NORTH CLARK ST.,
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ARIZONA HERPETOLOGICAL ASSOCIATION
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CITY_____ STATE_____ ZIP_____

AGE_____ or (circle one) UNDER or OVER 21 PHONE_____

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Have you done specific study with herps?

How did you first find out about A.H.A.?

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Adult_____	$10.00 yr.	Renewal _____	$ 7.50 yr.
Student or Under 18 _____			$ 5.00 yr.
Corresponding Member _____			$ 3.00 yr. (U.S.) Newsletter only

We will be glad to "EXCHANGE" newsletters with other herp clubs.

Send checks or herp club addresses to:

ARIZONA HERPETOLOGICAL ASSOCIATION
Grace Harris - Secretary
4028 N. 55th Avenue
Phoenix, Arizona 85031

SSAR Directory of Regional Herpetological Societies

The SSAR, through the efforts of its Committee on Regional Herpetological Societies, is attempting to establish a much closer relationship with those societies. In order to accomplish that end, questionnaires were sent to all of the societies for the purpose of compiling a current list and to gain some input as to how SSAR might be of greater assistance to regional societies.

The Committee chairperson, Tom R. Johnson, prepared questionnaires which covered the following topics: status of the society, hierarchy of the organization, membership, publications, frequency of meetings, and other pertinent information. The response reflects the amount of information that was returned. The status of many societies could not be determined so any corrections or additions would be welcome. Please send all information to:

Tom R. Johnson
Missouri Department of Conservation
2901 North Ten Mile Drive
Jefferson City, Missouri 65101

ARIZONA HERPETOLOGICAL ASSOCIATION
c/o Grace Harris, Secretary
4028 North 55th Avenue
Phoenix, Arizona 85031

Membership: 50 (+)
Meetings: Monthly
Publications: Newsletter

ARKANSAS HERPETOLOGICAL SOCIETY
5312 West 13th Street
Little Rock, Arkansas 72205

ASSOCIATION FOR THE CONSERVATION OF TURTLES AND TORTOISES (ACTT)
Tom Bloomer
4322 Woodbury Drive
Wyckoff, New Jersey 07481

Membership: 13

CANADIAN AMPHIBIAN & REPTILE CONSERVATION SOCIETY
Barbara Froom
8 Preston Place
Toronto, Ont., Canada M4N 259

Membership: 125
Meetings: NA
Publications: Bi-Monthly Newsletter

CHICAGO HERPETOLOGICAL SOCIETY
c/o Chicago Academy of Sciences
2001 North Clark Street
Chicago, Illinois 60614

Membership: NA
Meetings: Monthly
Publications: Monthly Newsletter
Quarterly Bulletin

COLORADO HERPETOLOGICAL SOCIETY
P. O. Box 15381
Denver, Colorado 80215

Meetings: Monthly
Publications: Monthly Newsletter
Annual Bulletin

CONNECTICUT HERPETOLOGICAL SOCIETY
Nancy R. Ford
598 Durham Road
Guilford, Connecticut

Membership: 114
Meetings: Monthly
Publications: Monthly Newsletter
Annual Bulletin

DALLAS HERPETOLOGICAL SOCIETY
Wayne Seifert, Department of Herp.
Dallas Museum of Natural History
P. O. Box 26193
Dallas, Texas 75226

Membership: 100
Meetings: Monthly
Publications: Monthly Newsletter

EASTERN SEABOARD HERPETOLOGICAL LEAGUE
Malvin Skaroff
1025 Lakeside Avenue
Philadelphia, PA 19126

FLORIDA HERPETOLOGICAL SOCIETY
Gopher Kuntz
8604 Lake Christie Drive
Orlando, Florida 32809

Membership: 40
Publications: Monthly Newsletter

FLORIDA WEST COAST HERPETOLOGICAL SOCIETY
John Lewis
1312 South Evergreen Avenue
Clearwater, Florida 33515

GEORGIA HERPETOLOGICAL SOCIETY
John C. Zegel
3341 Smoke Rise Drive
Stone Mountain, Georgia 33083

GREAT LAKES HERPETOLOGICAL SOCIETY
James Todd
15554 Cooper
Taylor, Michigan 48180

GREATER CINCINNATI HERPETOLOGICAL SOCIETY
Cincinnati Museum of Natural History
172 Gilbert Avenue
Cincinnati, Ohio 45202

Membership: 63
Meetings: Monthly
Publications: Monthly Newsletter

GULF COAST HERPETOLOGICAL SOCIETY
John Zapata
P. O. Box 1562
Houston Zoo
Houston, Texas 77001

KANSAS HERPETOLOGICAL SOCIETY

Janice Perry
Museum of Natural History
University of Kansas
Lawrence, Kansas 66045

Membership: 150
Meetings: 6 per year
Publications: Newsletter

KENTUCKY HERPETOLOGICAL SOCIETY
Eddie Ashmore
1300 Ambridge Drive
Louisville, Kentucky 40207

Membership: 60
Meetings: Monthly
Publications: Newsletter

MARYLAND HERPETOLOGICAL SOCIETY
Department of Herpetology
Natural History Society of Maryland
2643 North Charles Street
Baltimore, Maryland 21218

Membership: 250
Meetings: Monthly
Publications: Leaflets, Bulletins

MASSACHUSETTS HERPETOLOGICAL SOCIETY
P. O. Box 1082
Boston, Massachusetts 02103

MIDDLE MISSISSIPPI VALLEY HERPETOLOGICAL SOCIETY
Mike Lodato
925 Park Plaza Drive
Evansville, Indiana 47715

NEW MEXICO HERPETOLOGICAL SOCIETY
Department of Biology
University of New Mexico
Albuquerque, New Mexico 87131

Meetings: Monthly
Publications: Bi-Monthly Newsletter

NEW YORK HERPETOLOGICAL SOCIETY
David Hulmes
122 Second Avenue
Hawthorne, New York 07507

Membership: 350
Publications: Bulletin

NORTH CAROLINA HERPETOLOGICAL SOCIETY
Patricia Ashton
N.C. State Museum of Natural History
101 Halifax Street
Raleigh, North Carolina 27611

NORTHERN NEW JERSEY HERPETOLOGICAL SOCIETY
P. O. Box 94
Augusta, New Jersey 07822

NORTHERN OHIO ASSOCIATION OF HERPETOLOGISTS
Department of Biology
Case Western Reserve University
Cleveland, Ohio 44106

Membership: 175
Meetings: Monthly
Publications: Newsletter, Bulletin

OKLAHOMA HERPETOLOGICAL SOCIETY
Jeffrey Black
Department of Biology
Oklahoma Baptist University
Shawnee, Oklahoma 74801

PACIFIC NORTHWEST HERPETOLOGICAL SOCIETY
Frank Slavens
P. O. Box 30744
Seattle, Washington 98103

PHILADELPHIA HERPETOLOGICAL SOCIETY
John Robinson
ANSP, 18th and the Parkway
Philadelphia, Pennsylvania 19126

Membership: 400
Publications: Bulletin

SACRAMENTO VALLEY HERPETOLOGICAL SOCIETY
Bob Pedder
6007 Watt Avenue
North Highlands, California 95660

ST. LOUIS HERPETOLOGICAL SOCIETY
P. O. Box 9216
St. Louis, Missouri 63117

Membership: 75
Meetings: Monthly
Publications: Bi-monthly Newsletter

SOUTH FLORIDA HERPETOLOGICAL SOCIETY
Saul Friess
9972 N. Kendall Drive #54
Miami, Florida 33176

SOUTHERN ARIZONA HERPETOLOGICAL SOCIETY
Tom Boyden
4521 W. Mars Street
Tucson, Arizona 85704

Membership: 25
Meetings: Monthly

SOUTHWESTERN HERPETOLOGICAL SOCIETY
San Fernando Valley Chapter
Rick Korne
5730 Newcastle Avenue
Encino, California 91316

SOUTHWESTERN HERPETOLOGICAL SOCIETY
Bob Sanders, Curator of Herpetology
San Bernadino County Museum
2024 Orange Tree Lane
Redlands, California 92373

TEXAS HERPETOLOGICAL SOCIETY
Floyd E. Potter
Route #1, Box 120 EH
Bulvedre, Texas 78163

UTAH HERPETOLOGICAL SOCIETY
Hogle Zoological Gardens
P. O. Box 8475
Salt Lake City, Utah 84108

VIRGINIA HERPETOLOGICAL SOCIETY
Franklin J. Tobey, Jr.
P. O. Box 1376
Leesburg, Virginia 20075

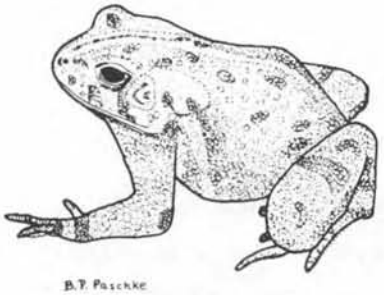
Membership: 250
Meetings: Irregular
Publications: Bulletin, Newsletter

WASHINGTON HERPETOLOGICAL SOCIETY
Scott Rae
317 Adahi Road, S. E.
Vienna, Virginia 21180

Membership: 35
Meetings: Monthly
Publications: Irregular Newsletter

WESTERN MASSACHUSETTS HERPETOLOGICAL SOCIETY
c/o Science Museum
236 State Street
Springfield, Massachusetts 01103

WISCONSIN HERPETOLOGICAL SOCIETY
Milwaukee Public Museum
800 West Wells Street
Milwaukee, Wisconsin 53233



B.T. Paschke

Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Standard Common and Current Scientific Names for North American Amphibians and Reptiles (Collins, Huheey, Knight and Smith, 1978). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Department of Biology, Virginia Commonwealth University, Richmond, Virginia 23284. Short manuscripts are only acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

CAUDATA

DESMOGNATHUS AURICULATUS (Southern Dusky Salamander). USA. TEXAS: Dallas Co: 3.2 km W Carrollton. Spring 1954. L. S. Roberts. Identified by W. Seifert. Dallas Mus. Nat. Hist. DMNH 2928-2931. Extends range 160.9 km W of previous western-most range (Dial, 1965. Southwest. Nat. 10(2): 143-144. The meristic data conforms to data given by Cook & Brown (1974. J. Herp. 8(1): 93-105) for Desmognathus auriculatus; however, these specimens were recently catalogued from the Southern Methodist University collections and their body pattern has faded out.

Submitted by WAYNE SEIFERT and DOUG WUERCH, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226.

DESMOGNATHUS OCHROPHAEUS (Mountain Dusky Salamander). USA. TENNESSEE: Campbell Co: 26.7 km S Jellico (Pine Mountain area). 16 March 1976. M. A. Morris, L. M. Page, B. M. Burr. Verified by P. W. Smith and M. A. Morris. Illinois Nat. Hist. Survey. INHS 10254. Extends range south from Kentucky into western

part of Tennessee Appalachians (Tilley, 1973, Desmognathus ochrophaeus, Cat. Amer. Amphib. Rept.: 129). Also observed at Hillton, McCreary County, Kentucky on same date, but specimens escaped.

Submitted by MICHAEL A. MORRIS, Illinois Natural History Survey, Urbana, Illinois 61801. ●

PSEUDOTRITON RUBER (Red Salamander). USA. FLORIDA: Hamilton Co: Suwannee River Floodplain along Rt. 135, 2 km E White Springs. 17 June 1976. W. Auffenberg. Florida State Museum, UF 39310. Extends range for this species into northern peninsular Florida. Nearest records to the west are from the Ochlockonee River drainage in the vicinity of Quincy, Gasden Co., Florida, a distance of 179 km (Carr, 1940, A Contribution to the Herpetology of Florida, Univ. Florida Press, Gainesville). Nearest records to the north are along the Altamaha River, 8.8 km N Jesup, Wayne Co., Georgia, a distance of 167 km (Martof. 1975. SSAR Cat. Amer. Amph.Rept., 167.1).

Submitted by PETER MEYLAN, Florida State Museum, Gainesville, Florida 32611. ●

ANURA

BUFO ALVARIUS (Colorado River Toad). USA. NEW MEXICO: Hidalgo Co: 23.2 km S Animas. 21 July 1977. E. L. Peters and Paul S. Freed. Verified by C. J. McCoy. Carnegie Mus. Nat. Hist., CM 66199. Extends range eastward from 1.8 km W and 1.4 km N Rodeo, Hidalgo County (Cole, 1962, Herpetologica 18(3): 172-175). First record from Animas Valley.

Submitted by ERIC L. PETERS and C. J. MCCOY, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania 15213.

BUFO VARIEGATUS (No common name). CHILE. Ofqui Isthmus of the Taitao Peninsula, (46° 42' S, 74° 5' W): 174 km SW Puerto Aysen, 4m - 100m elevation, 1 February 1976, G. Mann. Universidad Austral de Chile, IZUA N° 1661 - A. Previously known only from zones 400 m above sea level and from two areas in Chile; between 38° and 41° S and between 49° and 52° S. The specimens reported here fill the hiatus between these areas and amplify the elevational range of this species.

Submitted by GUILLERMO MANN, Wildlife Ecologist, Director of the Departmento de Conservacion del Medio Ambiente, CONAF, Ministerio de Agricultura de Chile, AV. Bulnes 285, Santiago, Chile. ●

TESTUDINES

EMYDOIDEA BLANDINGI (Blanding's Turtle). USA. NEW YORK: Jefferson Co: French Creek Marsh, 6 km SW Clayton. 7 August 1976. P. J. Petokas and M. Wasielewski. NEW YORK: Jefferson Co: N shore of Wellesey Island, Township of Orleans, St. Lawrence River. 22 August 1976. H. Miller. Roosevelt Wildlife Collection, SUNY College of Environ. Sci. and Forestry, 5512-5513 respectively. NEW YORK: Jefferson Co: Kring Point road N of Route 12, Township of Alexandria. 23 June 1977 and 27 June 1977. P. J. Petokas. Collection of P. J. Petokas, EB/6 and EB/8 respectively. Verified by M. M. Alexander. NEW YORK: Jefferson Co: Marshes of Goose Bay, Township of Alexandria, St. Lawrence River. 24 May 1977 to 9 August 1977. P. J. Petokas. 14 individuals collected, marked, and released. This report provides more precise locality information than is presently available for eastern known limits of range (McCoy, 1973, Cat. Am. Amphib. Rept. 136: 1-4). Known range should include the St. Lawrence River marshes of northern New York within the townships of Clayton, Orleans, and Alexandria, Jefferson County. Unverified observations and field data suggest that range extends inland to innermost extensions of St. Lawrence River tributaries and their associated marshes lying within the above townships along the river. Observation of a road-killed female bearing shelled, oviducal eggs on Interstate 81 South (mile 162, marker 1323), 27 km inland from the St. Lawrence River on 20 June 1977 suggests that range extends much farther inland than is presently known.

Submitted by PETER J. PETOKAS and MAURICE M. ALEXANDER, Department of Environmental and Forestry Biology, SUNY College of Environmental Science and Forestry, Syracuse, New York 13210. ●

MALACLEMYS TERRAPIN TERRAPIN (Northern Diamondback Terrapin). USA. NEW YORK: Westchester Co: Hudson River mile 43 at Indian Point 2 specimens: 8 August 1977, 12 October 1977. R. Kakerbeck. Verified by J. L. Platt. Museum of the Hudson Highlands, uncatalogued to date. This locality is 18 river miles N of the only other recent record of this species in the Hudson River (Boyle, R. H., 1969. The Hudson River-A Natural and Unnatural History. W. W. Norton and Company, New York. 304 pp.).

Submitted by JERRY L. PLATT, Curator, Museum of the Hudson Highlands, Cornwall-on-Hudson, New York 12520. ●

MALAYEMYS SUBTRIJUGA. USA. NEW MEXICO: Sierra Co: Elephant Butte Dam, 11.66 km NE Truth or Consequences. May 5, 1968. W. W. French. Verified by C. J. McCoy. New Mexico St. Univ. 4241. This species is native to southeast Asia (Schmidt and Inger. 1957. Living Reptiles of the World, Doubleday and Co., Inc., Garden City, New York) and this specimen obviously represents a release, as the species gets into the pet trade with fair frequency (C. J. McCoy, pers. comm.).

Submitted by ANDREW H. PRICE and DANE G. JOHNSON, Department of Biology, New Mexico State University, Las Cruces, New Mexico 88003. ●

SAURIA

HEMIDACTYLUS GARNOTI (Indo-Pacific Gecko). USA. FLORIDA: Martin Co: Hobe Sound. 19 October, 13 November 1977. S. Myers and W. Hutchinson. FSM/UF 41500-1503. Verified by W. Auffenberg. This locality lies ca. 139 km N of Miami record (King and Krakauer, 1966, Quart. J. Fla. Acad. Sci. 29(2): 144-154). UF 41503 was gravid, 85 mm TL, and laid 2 eggs, 25 November 1977. Geckos collected on a building next to landscaping outlet. Undoubtedly pop. started by individuals brought in on exotic plants. Indian River Co: Wabasso Beach, Barefoot Lane. 26 July 1976. M. McGranahan. FSM/UF 39065. Locality lies 231.6 km N of Miami record (King and Krakauer, 1966, Quart. J. Fla. Acad. Sci. 29(2): 144-154). Specimen appears to be newborn hatchling. Gravid female may have been inadvertently introduced by South Floridans.

Submitted by STEVEN MYERS, Indian River Community College, Mueller Center, Vero Beach, Florida 32960. ●

HEMIDACTYLUS TURCICUS (Mediterranian Gecko). USA. FLORIDA: Indian River Co: Winter Beach, 7.6 km N Vero Beach. 26 October 1977. S. Myers. FSM/UF 41415-41499. Verified by W. Auffenberg. Sebastian, S. Myers and W. Hutchinson, observed only. Winter Beach population lies 336.7 km south of Jacksonville record (Meylan, P. 1977. SSAR Herp. Review 8(2): 39) and 223.1 km north of the Miami record (Barbour, 1936, Copeia, 2: 113.). Geckos were found on a building which was formerly a landscaping outlet. Probably brought in on exotic plants.

Submitted by STEVEN MYERS, Indian River Community College, Mueller Center, Vero Beach, Florida 32960. ●

ANOLIS SAGREI (Brown Anole). USA. FLORIDA: St. Lucie Co: Ft. Pierce, S. Phillips, observed only. Indian River Co: Vero Beach, Leon Ave. 29 November, 15 December 1977. S. Myers. FSM/UF 41504-51505. Verified by W. Auffenberg. Found on Sabal palmetto. Locality lies 281.5 km south of St. Augustine record (Meylan, P. 1977. SSAR. Herp. Review

9(2): 39), and 117.4 km north of Riviera Beach pop. (King, 1960, Quart. J. Fla. Acad. Sci. 23(1): 71-73.

Submitted by STEVEN MYERS, Indian River Community College, Mueller Center, Vero Beach, Florida 32960. ●

CNEMIDOPHORUS SCALARIS SEPTEMVITTATUS (Plateau Spotted Whiptail). USA. TEXAS: Terrell Co: 33 km N Sanderson. 18 Aug. 1953. J. M. Selander and R. B. Selander. Verified by M. A. Morris. Illinois Nat. Hist. Survey, INHS 7302-7304. County record, extends range ca. 130 km NE nearest locality (Raun and Gelbach, 1972, Amphibians and reptiles in Texas, Bull. #2, Dallas Mus. Nat. Hist.).

Submitted by MICHAEL A. MORRIS, Illinois Natural History Survey, Urbana, Illinois 61801. ●

SERPENTES

MASTICOPHIS FLAGELLUM (Shaw) (Coachwhip). MEXICO: BAJA CALIFORNIA SUR: Isla Danzante: 25° 47' N, 111° 15' W. 10 July 1976. M. J. Wong. Verified by R. L. Goodrich and R. W. Murphy. California Acad. Sci. The specimen is a complete skin. Isla San Marcos: 27° 13' N, 112° 06' W. 28 and 30 May 1976. J. Myhan and R.L. Goodrich. Verified by R.W. Murphy. California Acad. Sci., CAS 141791 and CAS 143407 respectively. Scale counts and color pattern are within the variability described by Wilson (1970, Tulane Stud. Zool. Bot. 16(2): 31-99). The San Marcos specimens are characteristic of M. f. fulginosus (Cope).

Submitted by ROBERT L. GOODRICH, ROBERT W. MURPHY, JIM NYHAN and MICHAEL J. WONG. RLG, RWM, and MJW: Biology Department, University of California, Los Angeles, 405 Hilgard Avenue, Los Angeles, CA 90024. JN: 353 2nd Avenue, Colma, CA 94014. ●

LAMPROPELTIS PYROMELANA PYROMELANA (Arizona Mountain Kingsnake). USA: NEW MEXICO: Sierra Co: 2.66 km W Chloride. July 5, 1975. A. D. Thomas, Jr. Verified by A. H. Price. Alive in the collection of the latter. Extends range of the subspecies from the Arizona border 126 km eastward to the eastern edge of the Gila National Forest and the Black Range (Stebbins. 1966. A Field Guide to Western Reptiles and Amphibians, Houghton-Mifflin Company, Boston).

Submitted by ANDREW H. PRICE and DANE G. JOHNSON, Department of Biology, New Mexico State University, Las Cruces, New Mexico 88003. ●

LAMPROPELTIS TRIANGULUM CELAENOPS (New Mexico Milk Snake). USA: NEW MEXICO: Lincoln Co: Roadrunner Ranch, 53.3 km E Corona. July, 1976. W. Brett Whitford. Verified by A. H. Price. Carnegie Museum, CM 65970. First record for county, extends range of the subspecies 57 km SE of previously recorded locality (Williamson, 1972. Geographic Distribution: Lampropeltis triangulum celaenops. SSAR Herp. Review 4(5): 171).

Submitted by ANDREW H. PRICE and DANE G. JOHNSON, Department of Biology, New Mexico State University, Las Cruces, New Mexico 88003. ●

BOTHROPS YUCATANICUS (Yucatan Hognose Viper). BELIZE: CAYO DISTRICT: Benque Viejo. A. Versanel. U.S. National Museum, USNM 61781. Previously identified as Trimeresurus (=Bothrops) yucatanicus (Schmidt, 1941, Zool. Ser. Field Mus. Nat. Hist., 22(8): 475-510). Neill (1965, Bull. Florida St. Mus. Biol. Ser., 9(3): 77-130) summarized that Schmidt's specimen was B. nasutus and was followed by Henderson and Hoevers (1975, Milwaukee Publ. Mus., Contrib. Biol. Geol. 5: 1-63). Re-examination of the specimen confirms its identity as B. yucatanicus and establishes the presence of the species in Belize. Benque Viejo is some 300 km southward from the Tepich-Dziuche area of Quintana Roo, Mexico, which was previously the southernmost known locality (two specimens in the Museum of Natural History, University of Kansas, KU 157667-68).

Submitted by JAMES R. MCCRANIE, 10770 S.W. 164th Street, Miami, Florida 33157 and LOUIS PORRAS, 12120 S.W. 180th Street, Miami, Florida 33177. ●

CROTALUS RUBER LUCASENSIS Van Denburgh (San Lucan Diamond Rattlesnake). MEXICO: BAJA CALIFORNIA SUR: Isla Danzante: 25° 47' N, 111° 15' W. 10 July 1976. R. L. Goodrich. Verified by R. W. Murphy. California Acad. Sci. 143480. (Two previously collected specimens, unreported in the literature, are deposited at the California Acad. Sci., CAS 140096 and CAS 140366.) All meristic counts agree with description of the subspecies (Klauber, 1972, The Rattlesnakes, vol. 1, Univ. Calif. Press, Berkeley).

Submitted by ROBERT L. GOODRICH, ROBERT W. MURPHY, JIM NYHAN and MICHAEL J. WONG. RLG, RWM, and MJW: Biology Department, University of California, Los Angeles, 405 Hilgard Avenue, Los Angeles, CA 90024. JN: 353 2nd Avenue, Colma, CA 94014. ●

CROTALUS VIRIDIS ssp. (Western Rattlesnake). USA: COLORADO: Rio Blanco Co: Piceance Basin, Barcus Creek, Sec. 27, T2N, R98W. 6 July 1976. D. J. Freddy and J. L. Kogutt. Verified by H. M. Smith. Univ. Colorado Mus. UCM 51485. Eight rattlesnakes were observed in the Piceance Basin June through August, 1976. To our knowledge these are the first rattlesnakes observed in this Basin. Seven snakes were observed along Piceance Creek and one snake was collected (6 July) in Barcus Creek. Taxonomic characteristics of the specimen collected are intermediate between C. v. concolor and C. v. viridis (H. M. Smith, pers. comm.). Taxonomic status of rattlesnakes in northwestern Colorado is confusing. Klauber (1972, Rattlesnakes, their habits, life histories, and influence on mankind. Vol. I: 50, 51, 61) indicates C. v. concolor resides near the Basin and C. v. viridis exists disjunctly to the north. Smith, et al. (1965, Univ. Colo. Ser. Biol. 15: 22) and Stebbins (1966, A field guide to western reptiles and amphibians. p. 262) recognize only C. v. concolor in northwestern Colorado. This note is a contribution from Federal Aid in Wildlife Restoration, P-R Project W-38-R Colorado.

Submitted by DAVID J. FREDDY and JEFFREY L. KOGUTT, Colorado Division of Wildlife, Kremmling, Colorado 80459. ●

A Second Mexican Specimen of Crotalus willardi obscurus From the Sierra San Luis, Chihuahua, with Comments on other Members of the Herpetofauna

On 18 July 1977, we collected a specimen of Crotalus willardi obscurus Harris, 1974 at 1980 m in a small canyon extending north from the Canon del Oso, 11.6 km NW Rancho San Francisco on the eastern side of the Sierra San Luis, Chihuahua, Mexico. This specimen represents the second record for this subspecies from Mexico. It was found coiled on a rock in the bottom of the canyon in an area covered by oaks and carpeted with oak leaves.

The specimen, in the collection of the senior author, is a juvenile female 280 mm in total length and exhibits the following characteristics: ventrals, 152; subcaudals, 24; scale rows 27-25-19; dorsal ground color pale brown anteriorly grading to brownish-gray posteriorly; body blotches, 26, more prominent posteriorly; interspaces pale pink; some scattered black spots the entire length of body; head pale brown with a few scattered black spots on the dorsum; last four supralabials pale pink (remnant of the lower facial stripe); one tail blotch evident; remainder of tail black, horizontal tail stripes barely evident.

Harris and Simmons (1976) reported the first Mexican specimen of

C. w. obscurus from the western slope of the Sierra San Luis. Our specimen from the eastern slope suggests that the snake may be widespread in the wooded canyons of the range.

Bogert and Degenhardt (1961) mentioned that, in the Animas Mountains of New Mexico, "it is improbable...that C. rotalus lepidus klauberi, primarily an inhabitant of rocky aras, occurs in the wooded habitat occupied by C. w. silus" (= C. w. obscurus). We collected, however, two specimens of C. l. klauberi at elevations of 1960 and 2010 m, both coiled among oak leaves in the bottom of canyons in the same habitat in which the C. w. obscurus was found. However, the slopes above the canyon were rocky and C. lepidus probably occurs there, but our specimens may have retreated to the cooler canyon bottoms to escape the hot, dry conditions existing at the time of our visit.

Other reptiles and amphibians found in the general area of the Canon del Oso are as follows: Hyla arenicolor (tadpoles); Cnemidophorus exsanguis; Sceloporus jarrovi; S. virgatus; Urosaurus ornatus; masticophis bilineatus (seen); Crotalus molossus (photographed and released).

All material is to be deposited in the Museum of Zoology at Louisiana State University.

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Submitted by JAMES R. MCCRANIE, 10770 S.W. 164th Street, Miami, Florida 33157 and LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, Florida 33176.

STERNOTHERUS MINOR (REPTILIA, KINOSTERNIDAE) IN THE PASCAGOULA RIVER SYSTEM, MISSISSIPPI

Apparent absence of the loggerhead musk turtle, Sternotherus minor, in the Pascagoula River System of eastern Mississippi has been a zoogeographic enigma. Tinkle and Webb (1955, Tulane Stud. Zool. 3(3): 53-67), Tinkle (1958, Ibid. 6(1): 1-56), and Iverson (1977, Copeia (3): 502-517) all concluded the species is absent from the Pascagoula. During the period 4-9 July 1977, we collected both Sternotherus minor peltifer (CM 65562-65566) and S. carinatus (CM 65545-65561) from the Chickasawhay River (main eastern branch of the Pascagoula), 4.8 km W Waynesboro, Wayne, Co., MS.

Discovery of S. minor in the Pascagoula drainage has both systematic and zoogeographic significance. Tinkle and Webb (op. cit.) separated S. carinatus and S. minor, and suggested that they may be sympatric. Although most authors have accepted this scheme, the microsympatric Waynesboro occurrence provides the ultimate corroboration. Iverson (op. cit.) hypothesized an upland route, involving capture of western tributaries of the Tombigbee River, to explain the presence of minor in the Pearl River west of the Pascagoula. This collection suggests direct dispersal through the Pascagoula headwaters as a more likely route. Finally, this collection confirms the conclusion of Tinkle and Webb (op. cit.) that the type-locality of minor lies in the Pascagoula drainage.

ACKNOWLEDGMENTS

Field work supported by the Netting Fund, Carnegie Museum of Natural History (CM). Marsha K. Christianson assisted in the field; John B. Iverson commented on the manuscript.

Submitted by: C. J. McCOY and ARTHUR V. BIANCULLI, Carnegie Museum of Natural History, Pittsburgh, PA 15213, and RICHARD C. VOGT, University of Wisconsin, Madison, WI 53706.

News Notes

GROUND BROKEN FOR REPTILE HOUSE

On 10 April 1978, after three years of design and planning, the Roeding Park Zoo, Fresno, California has broken ground on its first major herpetology facility.

The attractive 5,800 square foot adobe building contains 31 specially designed electronically controlled environmental chambers. These totally portable units can be individually programmed to control temperature, humidity and light cycle for any reptile or amphibian's needs. Each unit contains its own compressor, thermal alarms, programmable timer, and separate humidity source and controls. Special, full-spectrum flourescent lights are rheostatically controlled to duplicate the rising and setting of the sun. Complete flexibility of daylight cycle is achieved.

Additional features include separate spare amphibian and reptile rooms, each with their own temperature control; a quarantine room; moveable wall panels to allow total flexibility in display presentation; and a remote rear-projected audio-visual presentation, which is narrated, concerning behavioral or physiological information about herptiles.

The grounds around the facility are profusely planted with over 300 trees and shrubs set among large boulders and logs. A naturalistic turtle pond will be presented, complete with its own biological filter built into the pond bottom.

Completion date is set for 26 October 1978, and public viewing is planned for 1 January 1979.

...from AAZPA Newsletter, 19(6): June 1978.

INFORMATION ON HERPS OF EL SALVADOR NEEDED

Sr. Hugo Hidalgo (Ave. San Jose No. 374, Col. El Refugio, San Salvador, El Salvador, Central America) is preparing a field guide to the herps of El Salvador. He would appreciate hearing from anyone with field data, range data, photos, etc. involving herps of this area.

THE CHAMAELEON RESEARCH CENTER

Old World chamaeleons have been imported for the pet trade for many years. Last year over 20,000 Jackson's chamaeleons were exported from Africa. Because of the difficulty in keeping chamaeleons in captivity, these beautiful reptiles die in large numbers. There are some who would like to see something done about it.

Our center has bred chamaeleons in the past, but it has had problems distributing information to others interested in breeding these delicate animals.

We need members, and if you would like to join, just write to the address printed below. For the moment there will be no fee.

You will receive a bi-annual journal, a newsletter every three months. The journal will contain articles from all over the world about old and new ideas in chamaeleon breeding. The newsletter will contain interesting bits of information, as well as announcements and ads.

The ideas offered here would be of great interest to anyone involved in reptile breeding.

Write to:

David Rivas
116 East 95th Street
New York, New York 10028

PISTOIA MEMORIAL

On April 15, 1978, a plaque was installed in the Reptile House at the Columbus Zoo in fond memory of Louis Pistoia, for his lifelong contributions to the science of herpetology and his dedicated efforts in establishing the Columbus Zoo's Reptile Collection as one of the finest and largest in the United States. During his tenure at the Columbus Zoo, he designed the innovative Reptilia-Amphibia Hall which opened in 1968. In 1973, Mr. Pistoia and the Columbus Zoo received the distinguished Robert Bean Award from the American Association of Zoological Parks and Aquariums, specifically for breeding and raising Jamaican Boas.

NEW HERP REPRINT

Fossil Lizards of North America by Charles W. Gilmore, 1928. Reprinted with permission from the National Academy of Sciences, by the Riverside Museum Press (1978). This 50th anniversary edition features an introduction by Richard Estes, recapping advancements in paleoherpetology since 1928.

Riverside Museum Press, P. O. Box 547, Riverside, California 92501, U. S. A., $24.95.

NEW HERP HUSBANDRY BOOK

Bonath, Klaus. 1977. Narkose der Reptilien, Amphibien und Fische. Verlag Paul Parey. Berlin and Hamburg. 159 pp., 30 figures and 30 pages. This is part of the series: "Schriftenreihe Versuchstierkunde" No. 4. The paperbound price is DM 49- or about $25.00.

The book covers in quite detailed fashion the latest material on anaesthetics of lower vertebrates including dosages, methods of administration, etc.

Address of the publisher: Verlag Paul Parey, Lindestrasse 44-47, D-1000 Berlin 61, West Germany.

IGUANA INFO NEEDED

Matt Braunwalder (Finsterrutistrasse 5, 8134 Adliswil, Switzerland) is preparing a comprehensive article on captive maintenance of Iguana iguana for SALAMANDRA. He would appreciate receipt of reprints dealing with any aspect of their husbandry, ecology and reproduction, as well as data pertaining to these topics. The University of Zurich library is not complete enough to allow a thorough study. Material should be airmailed to eliminate loss.

HERPERVERTOLOGICAL REVIEW II

For those who said it couldn't be done. In spite of those who said it shouldn't be done. Herpervert. Rev. Vol. 0 no. 2 glooms on the horizon, and will grace your packets at the 1980 meeting of SSAR. So, those of you who were too chicken to contribute to 0 (1), or those of you villified in 0 (1) who seek revenge, or those of you just released from mental institutions, here's your big chance. CONTRIBUTE! Otherwise, Pisani will have to do the whole reeking thing himself, and y'all know what that means. Send your deprecations to George Pisani (address on inside front cover), who will cull the wheat from the chaff and save the latter.

EDWARD HARRISON TAYLOR

An Edward H. Taylor Memorial Fund for the aid of students in herpetology has been established at The University of Kansas Endowment Association, Lawrence, Kansas 66045. (An obituary will appear in the December issue of Herpetological Review.)

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Current Literature

As of March, 1978, approximately 87 searchers are scanning 450 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

A new feature of Current Literature is the inclusion of senior author addresses. Although only a small portion of the citations have the addresses included in this issue, it is a goal to publish addresses for a majority of the citations for Current Literature in 1979.

Richard D. Worthington, Current Literature, Department of Biological Sciences, The University of Texas at El Paso, El Paso, Texas 79968.

EDITOR'S NOTE: With this issue of HR, we begin trial of a new format for Current Literature. HR 9(4) will use the same format, except that column separation will be increased. The editors would appreciate reader comments pro or con. The intent of Current Literature is to serve you, while remaining within certain cost limits. If this format gains user acceptance, we can increase the number of titles presented by 1/3 within our present budget.

GRP

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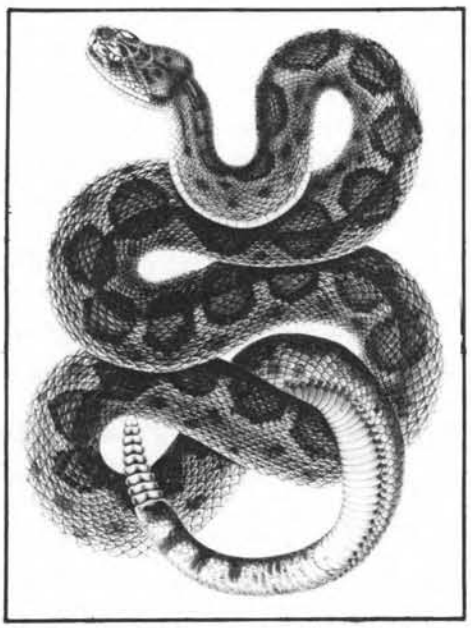
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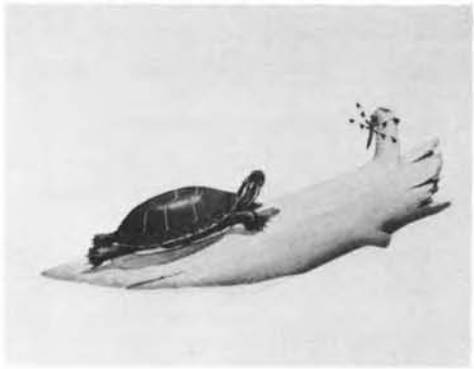
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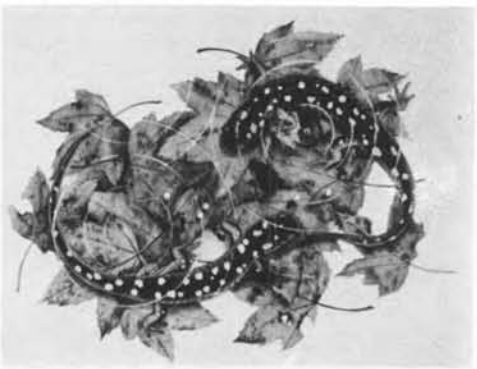
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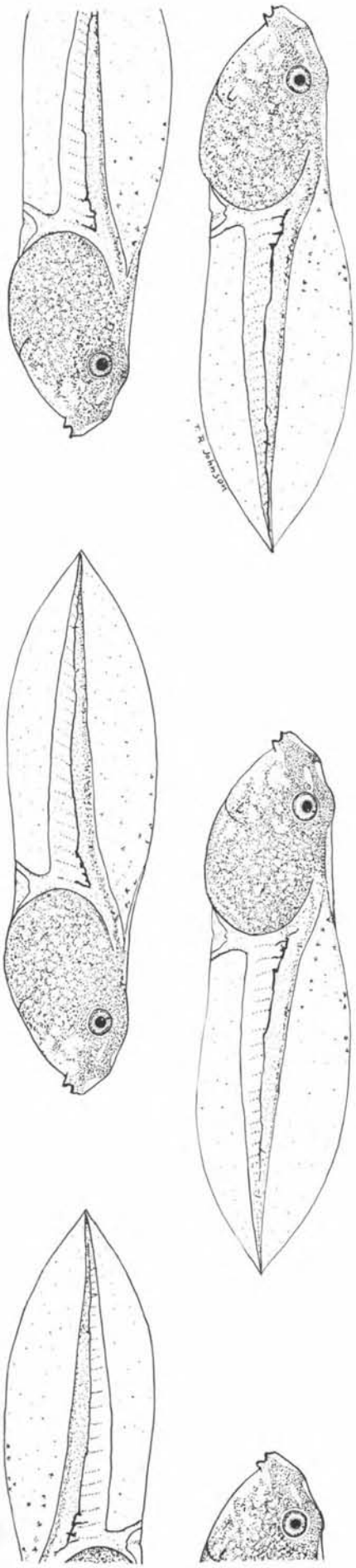
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Contents

FEATURE ARTICLES

Intra-abdominal retention of eggs by the soft-shelled turtle Lissemys punctata punctata (Bonnaterre) (Reptilia: Testudines: Trionychidae), by P.L. Duda and V.K. Gupta 46

Predation upon bats by Epicrates cenchris cenchris in Colombia, by T.O. Lemke 47

An albino Chelydra serpentina serpentina (Reptilia: Testudines: Chelydridae) from Ohio, by G.O. Vigle 47

Bullfrogs preying on cedar waxwings, by T. Gollob 47

An albinistic sagebrush lizard, Sceloporus graciosus, by M.M. Eells 48

A report on the restoration of the preserved amphibian and reptile collection of the Toledo Zoological Society 48

SSAR Treasurer's Report for 1977 49

BOOK REVIEWS

"The Amphibians of Missouri" by Tom R. Johnson. Reviewed by R.A. Brandon 50

"The Amphibians of Missouri" by Tom R. Johnson. Reviewed by B.P. Paschke 50

"A Biogeographical Analysis of the Chihuahuan Desert Through its Herpetofauna" by David J. Morafka. Reviewed by R. Heyer 50

LEGISLATIVE ALERT

Final rulemaking actions, proposed regulations, state news, by T.J. Berger 51

Herpetologists and the Pan American Convention, by C.K. Dodd, Jr. 52

HERPETOLOGICAL HUSBANDRY

Chemosensory searching for wounded prey by rattlesnakes is released by striking: a replication report, by D. Chiszar, C.W. Radcliffe, and H.M. Smith 54

Reproduction of the gray-banded kingsnake, Lampropeltis mexicana alterna, by R.O. Assetto, Jr. 56

Spiny chuckwallas bred at the Fort Worth Zoo, taken from AAZPA Newsletter 57

Some aspects of breeding and raising aquatic chelonians: Part II, by B.W. Tryon 58

GEOGRAPHIC DISTRIBUTION

New records 61

Two snakes, Leptophis modestus and Pelamis platurus, new to the herpetofauna of Honduras, by L.D. Wilson, J.R. McCranie, and L. Porras 63

NEWS NOTES 64

CURRENT LITERATURE 65

ADVERTISEMENTS 79

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Intra-Abdominal Retention of Eggs by the Soft-Shelled Turtle *Lissemys punctata punctata* (Bonnaterre) (Reptilia:Testudines:Trionychidae)

The tendency of turtles to retain eggs abdominally has been occasionally reported (Cagle, 1944; Cagle and Tihen, 1948; Risley, 1933). Though a natural event, such retention has been generally attributed to lack of suitable conditions for egg deposition. However, in one case, *Deirochelys reticularia*, retention of shelled eggs in the abdomen has been attributed to abraded oviducts (Cagle and Tihen, 1948).

A solitary case of intra-abdominal retention of eggs was observed by the authors in a mature female *Lissemys punctata punctata* among fifty or more that had been dissected by the junior author. The turtle was collected on 20 March 1976 from a shallow pond near Ranbirsingh Pora, 24 KM south of Jammu city. It weighed 1205 gm. Its carapace measured 214 mm in length and 202 mm in width. On dissection for routine gonadal studies on 23 March 1976, 4 full-size eggs with intact shells were found free in the abdominal cavity, two in each side. One of the left-side eggs had the shell partially mineralized. The oviducts in this specimen were conspicuously small and lacked differentiation into typical parts, the infundibulum, tubar, uterus and vagina. These reduced and stump-like oviducts looked like the combined uterine and vaginal regions of the normal oviducts. Neither contained any egg inside it. The right oviduct was 50 mm long and the left 80, whereas in a normal specimen of about the same size and weight, the length of the oviduct reaches more than 600 mm and is fully differentiated into the aforementioned regions.

In sections (Figs. 1 and 2), a strong histological differentiation was observed. The mucosal epithelium was very thin, lacked ciliary tracts and was backed up by the uterine glands. These glands were, however, less abundant than in the normal oviduct. Longitudinal folds characteristic of normal oviducts, were inconspicuous, although a thick loose connective tissue was seen to intervene between the glandular zone and the mucosa (Fig. 1). In normal oviducts, this tissue is comparatively thinner.

Normally, *L.p. punctata* oviposits from August through October, a period which corresponds to the post-monsoon months in Jammu. Thus, the presence of eggs in the month of March in this specimen is unseasonal and the conditions for their laying most unsuitable. While such a retention may well explain reports of unseasonal presence of eggs or the irregular deposition of eggs, as has been hinted by Cagle and Tihen (1948), it could as well be the reverse (late development and unfavorable season causing retention. --ed.). The latter possibility is higher and more reasonable.

Although intra-abdominal retention of eggs in the turtle *Deirochelys reticularia*, has been attributed to its abraded oviducts (Cagle and Tihen, 1948), in the present case wherein the oviducts were also deformed, a similar retention cannot be due to puncture or abrasion. The presence of shells implies a cranio-caudal passage of these eggs through normal oviducts. Either adverse seasonal conditions or lack of appropriate laying grounds must have led to the failure of this clutch of eggs to be deposited. The eggs thus seem to have reversed their normal passages, such reversed ovular movements being already on record (Risley, 1933), and as a result lodged in the abdominal cavity rather than be abandoned to adverse climatic conditions and lost.

The deformity in the oviducts in this turtle could also be an outcome of the reversed movement of the eggs, which in the region of the tubar have overcome the resistance offered by this narrowed section by rupturing the oviducts and falling free into the abdominal cavity. This explains the absence of characteristic ostium, infundibulum and tubar of these oviducts. This rupturing, though apparently more severe than that seen by Cagle *et al.* (1948), is the same basic cause of the *Deirochelys* and the *Lissemys* eggs being free in the abdominal cavity. Moreover, although abnormal, such retention of eggs is obviously unaccompanied by any lethal implications for the mother, but from a population standpoint, she would have been a liability as she would be then a consumer of resources who could not reproduce her species any longer due to massive oviducal damage.

ACKNOWLEDGMENTS

We are thankful to Professor Y.R. Malhotra, Head of the Department of Bio-Sciences, University of Jammu, for facilities to work. To the unknown reviewer, we owe our gratitude for drawing our attention to the implications of such damage and retention from a population standpoint.

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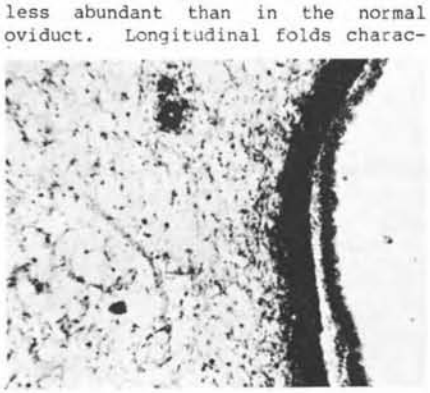


Fig. 1. A cross section through the oviduct, showing thin mucosal epithelium, uterine glands and loose connective tissue.



Fig. 2. A cross section through the oviduct, showing the absence of ciliary tracts.

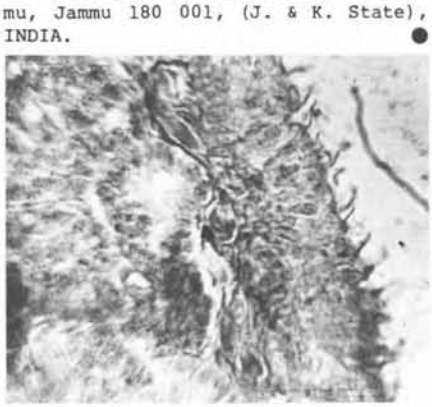


Fig. 3. A cross section through the normal oviduct, showing the presence of ciliary tracts.

Predation Upon Bats by Epicrates cenchris cenchris in Colombia

On 27 September 1976, while collecting bats during the day in El Parque Nacional Natural de la Macarena, Meta, Colombia, I observed a Brazilian rainbow boa, Epicrates cenchris cenchris, apparently foraging among a group of leaf-nosed bats (Phyllostomatidae) which were disturbed from their roost site along the rock ledges of a narrow cave located at the junction of Cano Nevera and the Rio Zanza (3° 10' N lat., 74° 5' W long.; alt. 600 m). When discovered, the boa was approximately 15 m from the cave entrance and 2 m above the cave floor in almost total darkness. The snake was captured, photographed, examined carefully, and then released. The specimen measured 1.15 m total length, and contained one "bat-shaped" prey item protruding against its sides. Palpation supported the suspicion that the prey was a bat, revealing forearm bones, body shape, and skull size all approximating the correct dimensions of the bats in the cave. Bats from the cave were collected and identified as a single species of short-tailed leaf-nosed bat, Carollia perspicillata (Pine 1972); several hundred individuals occupied the small cave. In all probability, and to my satisfaction, the evidence indicates the snake was preying upon this species of bat. A dead specimen of Epicrates cenchris cenchris was found on a nearby trail and collected for identification.

Other members of the Boidae have been reported to prey upon bats, including an African python (species not given), the Cuban boa, Epicrates angulifer, and the common boa constrictor, Boa constrictor imperator (Thomas 1974). This is the first account of Epicrates cenchris cenchris preying upon bats in the wild. Bat caves in the tropics offer excellent feeding areas for snakes, often containing large numbers of roosting bats and narrow ledges on which to hunt them.

My work in Colombia was supported by the Smithsonian-Peace Corps Environmental Program. I am grateful to Dr. Federico Medem, Director of the Instituto Roberto Franco, Universidad Nacional de Colombia, Villavicencio, Colombia for identifying the snake and encouraging me to write this note. I also thank fellow Peace Corps volunteers Tom Defler and Paul Gertler for assistance in the field.

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An Albino Chelydra serpentina serpentina (Reptilia: Testudines: Chelydridae) From Ohio

Albino specimens of Chelydra serpentina serpentina have been reported twice before in the literature. Hensley (1959) reported two cases of albinism in this subspecies: a specimen from near Windsor (Ontario), Canada, and another specimen that was kept alive at The Childrens Nature Museum in Charlotte, North Carolina. Judd (1970) reported another albino Chelydra serpentina serpentina from southern Ontario, Canada.

Here, the authors wish to report another case of albinism in a Chelydra serpentina serpentina hatchling. The specimen (Figure 1), lacking all pigment and having pink eyes and a carapace length of twenty-eight millimeters, was collected near the town of Fairfield (Butler County), Ohio, in late March-early April 1975 (exact date unknown). It was given to one of the authors by a man who stated that he had found it floating down a small stream, in a lethargic condition.

The hatchling was kept alive for approximately six months and was fed a diet of shrimp and fish with vitamin and calcium supplements. While in captivity, algal growths appeared on its carapace, and were periodically scrubbed off (nonetheless, the preserved specimen still has some remaining algae adhering to its carapace). The turtle died of unknown causes in September of 1975.

The specimen has been placed in the collection of The Division of Reptiles and Amphibians of the National Museum of Natural History-Smithsonian Institution, USNM 203839.



Figure 1. Dorsal view of albino Chelydra serpentina serpentina hatchling. Dark blotches are algal growths.

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Bullfrogs Preying on Cedar Waxwings

The senior author, accompanied by Francis Becker on 20 and 21 April 1971, visited the Don Crawford ranch about six miles north of Strawn, Palo Pinto County, Texas. One extremely common bird observed on this trip was the Cedar Waxwing (Bombycilla cedrorum), of which great numbers were noted coming to drink at the ranch's various stock ponds. On the 20th of April, over 1,000 birds were seen, and on the following day, an estimated 2,000 waxwings were present at the ponds. The water level in the ponds was very low, averaging about six to eight feet below normal due to a rather severe six-month drought. During this time, the weather conditions continued hot and dry with clouds prevailing.

On 20 April, waxwings came in large flocks (several hundred at a time) to the willow trees (Salix sp.) on the dam of one of the ponds. The birds swarmed down in a continuous stream to drink at the edge of the dam which was lined with stone. On several occasions, the birds were also seen on the mud at the edge of the pond. About a dozen large (14 to 16 inches extended length) bullfrogs (Rana catesbeiana) were spaced at intervals of four to five feet along the bank of the dam. Since some of the frogs appeared unusually fat, several of the larger ones were collected and their stomach contents examined. One stomach contained remains of two Cedar Waxwings, of which one was partly digested and the other appeared to have just been taken. A fresh waxwing was found in the second stomach.

On 21 April, several more large frogs were collected and three stomach contents examined. Each of these contained a Cedar Waxwing. A fourth



frog was observed sitting in the shallow water of a pond with a waxwing's tail feathers protruding from its mouth. All the birds presumably were swallowed head first as the heads appeared the most digested in the majority of cases. In addition, the frog stomachs held remains of unidentified beetles.

Although frogs were not seen capturing Cedar Waxwings, this predation seemingly was influenced by the local conditions. Cedar Waxwings commonly frequent the area since much Ashe Juniper (Juniperus ashei) is found in Palo Pinto County. Pulich has seen over 5,000 waxwings in this area in a single day in previous winter periods. The birds feed upon the berries produced by juniper. Being voracious feeders they gorge themselves and then fly to water to drink, a feeding habit well evidenced by the tell-tale signs of red-washed berry droppings around all the dams and edges of the ponds. This, coupled with the birds' flocking habits, provided the proper environment for frogs to readily capture Cedar Waxwings. This predation was not unique to just one pond, as remains of Cedar Waxwings were found in the stomachs of frogs collected from three different ponds on the ranch.

Carpenter and Morrison (Bios 44: 188-193, 1973) found two Cedar Waxwings in stomachs of two of the 124 bullfrogs sampled during a study which was conducted in the fall of 1970 and the spring of 1971 near Stephenville, Erath County, less than 40 miles away from the Crawford ranch. They concluded "...that the bullfrog is an opportunist and will eat anything it can catch and swallow..."

Thus, the drought conditions prevailing locally during this time certainly made the Cedar Waxwing a vulnerable food item.

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An Albinistic Sagebrush Lizard, Sceloporus graciosus

On August 30, 1975, an immature albino specimen of Sceloporus graciosus was collected at a residence in Weaverville, Trinity County, California. At the time of capture, the specimen was basking on a cement block which measured 20.2 x 40.4 cm. The lizard lacked melanic pigment, and the eyes were totally pink. The snout-vent length was 24 mm, the tail 15 mm. The albino appeared to be less active than normally pigmented ones brought into the laboratory at the same time. When mealworms of various sizes were offered the albino, it made no attempt to feed. Normal lizards fed actively. This behavior compares to that observed by Eells (1964) in an immature albinistic specimen of Taricha torosa, which refused food while normal salamanders actively fed under the same conditions. Childs (1953), in a study of predation on albino and normal spadefoot toads, Scaphiopus hammondi, reported that subsequent to metamorphosis the albinos became shriveled, lethargic, and died, while numerous normally pigmented toads were alive and healthy under the same conditions. This suggests that the albino animals may not have been feeding as actively as the normal ones.

The specimen is presently located in the Conservation Department, Trinity High School, Weaverville, California 96093.

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Dorsal view of albino Sceloporus graciosus.

A Report on the Restoration of the Preserved Amphibian and Reptile Collection of the Toledo Zoological Society

The Toledo Museum of Science and Health is housed on the grounds of the Toledo Zoo, and is operated by the Toledo Zoological Society. The preserved amphibian and reptile collection housed in the museum building was collected and curated under the guidance of Dr. Roger Conant during the period when he was curator of reptiles at the zoo. The bulk of the material was collected during the years 1930 through 1934. Collections were made preparatory to Conant's comprehensive work on the reptiles of Ohio, published in 1938. Most of the specimens of reptiles in the collection represent important locality records cited in Conant's work, and hence the collection is of considerable value despite its relatively small size (ca. 2800 specimens).

My involvement with the collection began May 1977 while visiting the zoo. At that time I examined the collection, which was in a deteriorated condition, and was told that the zoo was desirous of having it restored. I later sent a proposal to the director of the zoo offering to restore the collection, and funding was obtained to employ me for such a project during the month of November 1977.

The collection room had been established approximately six years before my arrival, and at that time some effort had been made to improve the condition of the collection. This consisted primarily of cleaning the entire room. Until that time, the room had apparently not been opened since the late 1930's.

Specimens in the collection are stored in glass jars with heavy wire closures and rubber seals, each specimen having an attached metal tag bearing a catalog number. Data for each specimen is recorded on a label attached to the outside of each jar. Unfortunately, time did not permit me to make proper labels for the inside of each jar. Specimens are catalogued by accession number, with the amphibians and reptiles catalogued separately. There are no indices to the collection.

The restoration procedure consisted of cleaning each jar, replacing the preservative and rubber seal, and making certain that each specimen had the catalog number securely attached. In addition, the collection was arranged on the shelves in precise taxonomic order and necessary taxonomic corrections were made. Fortunately, the original curation of the collection had

been well done, and the majority of the specimens were in good condition.

Approximately 3275 specimens were listed in the collection catalog, of which 459 specimens (14%) were missing. The remaining 2816 specimens consist of ca. 75% reptiles and 25% amphibians. Of the reptiles, largest holdings are of the genera Chrysemys, Natrix, and Thamnophis, with these genera comprising 44% of the total reptile content of the collection. The largest amphibian holdings are of the genera Desmognathus, Plethodon, and Rana, and comprise 58% of the total amphibian content. The taxonomic content of the collection is presented in Table 1.

Geographically, 72.5% of the collection is from Ohio, with the remainder coming from various other states as follows: Tennessee, 5.1%; Oklahoma, 1.5%; North Carolina, 1.2%; and Michigan, 1%. The remaining 5% come from the states of Arizona, Colorado, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Minnesota, Montana, New Jersey, New York, South Carolina, Utah, Virginia, and Washington.

Unfortunately, several problems were encountered during the restoration process (these arising primarily from a shortage of time and supplies), and I was unable to do as thorough a job as I had originally planned. I preserved 62% of the collection in 70% ethyl alcohol, after which the supply was exhausted, and I was forced to preserve most of the remaining specimens in 10% buffered formalin. Due to the lack of time and supplies, I was unable to finish the restoration of specimens of Thamnophis, as well as several of the amphibian genera.

The museum has adopted a policy whereby no specimens are to be sent out on loan. However, researchers ar welcome to come to the museum to examine specimens. Inquiries concerning the collection should be addressed to Mr. Joseph Beckler, Curator, Museum of Science and Health, The Toledo Zoo, 2700 Broadway, Toledo, Ohio 43609.

ACKNOWLEDGMENTS

I wish to thank the following officials of the Toledo Zoo for their assistance: Mr. Joseph Beckler, Museum Curator; Mr. William Dennler, Curator of Reptiles; Mr. Martin Jan, Museum Coordinator; and Mr. Phillip Skeldon, Executive Director. I would also like to thank my part-time student assistants, Ms. Nancy Bennett and Ms. Kelly Gage.

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Table 1. Taxonomic content of TZS preserved amphibian and reptile collection as of December 1, 1977.

Genus	Number of Species Represented	# of Specimens
REPTILES:		
Lizards:		
Anolis	1	1
Cnemidophorus	2	5
Coleonyx	1	20
Crotaphytus	1	2
Eumeces	4	99
Gerrhonotus	2	6
Leiolopisma	1	3
Ophisaurus	2	2
Phrynosoma	3	15
Sauromalus	1	2
Sceloporus	3	74
Sphaerodactylus	1	1
Uta	1	1
Snakes:		
Agkistrodon	3	87
Carphophis	1	48
Cemophora	1	1
Coluber	1	56
Crotalus	8	68
Diadophis	1	75
Elaphe	4	66
Farancia	1	1
Heterodon	2	15
Lampropeltis	4	66
Leptotyphlops	1	2
Lichanura	1	2
Liodytes	1	1
Masticophis	5	17
Micrurus	1	5
Natrix	9	482
Opheodrys	2	30
Pituopis	3	3
Salvadora	1	2
Sistrurus	2	67
Sonora	1	10
Stilosoma	1	1
Storeria	2	97
Tantilla	2	3
Thamnophis	6	277
Tropidoclonion	1	1
Virginia	1	1
Turtles:		
Chelydra	1	42
Chrysemys	3	166
Clemmys	3	32
Emydoidea	1	12
Gopherus	3	4
Graptemys	3	40
Kinosternon	1	1
Malaclemmys	1	1
Sternothaerus	1	33
Trionyx	2	27
AMPHIBIANS:		
Frogs and Toads:		
Acris	1	53
Bufo	3	54
Gastrophryne	2	5
Hyla	4	11
Pseudacris	3	27
Rana	6	116
Scaphiopus	2	22
Salamanders:		
Ambystoma	5	57
Desmognathus	3	183
Eurycea	3	36
Gyrinophilus	1	9
Hemidactylium	1	6
Notophthalmus	1	11
Plethodon	8	110
Pseudotriton	2	5

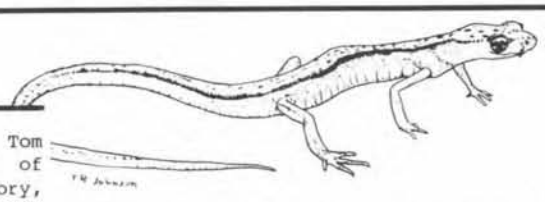
GREGORY O. VIGLE, 713 Avon Fields Lane, Cincinnati, Ohio 45229.

SSAR Treasurer's Report For 1977

INCOME	
Dues	$ 15,345.83
Subscriptions	6,530.00
Contributions	3,919.94
Royalties	118.88
Publication Sales	15,459.91
Rebates	853.08
Reprint sales and advertisements	3,392.54
Interest	3,151.44
SSAR Catalog Amer. Amph. Rept.	7,879.20
Subtotal	$ 56,650.82
Balance in account 1 January 1977	62,778.15
TOTAL	$119,428.97
DISBURSEMENTS	
Journal of Herpetology	20,872.91
Herpetological Review	6,103.00
Herpetological Circulars	1,219.75
Small Facsimile Reprints	428.42
Book Facsimile Reprints	20,527.32
Expenses of Secretary	283.30
Expenses of Elector	452.23
Expenses of Treasurer	1,570.73
Expenses of Publications Secretary	2,348.25
Expenses of Asst. Publications Secretary	582.83
Annual Meeting (of which $853.08 refunded)	1,285.49
Current Literature Titles	97.54
Bank charges	389.19
Translations (refunded)	50.00
ASC Dues	18.75
Zoological Record Contribution	100.00
Student Award	100.00
SSAR Catalog Amer. Amph. Rept.	3,785.48
	$ 60,215.19
Balance as of 1 January 1978	$ 59,213.78

HENRI C. SEIBERT
SSAR Treasurer
26 February 1978

Book Reviews



THE AMPHIBIANS OF MISSOURI, by Tom R. Johnson, 1977. University of Kansas Museum of Natural History, Public Education Series No. 6. viii + 134 pp., 67 figures, 42 maps, $5.00 Paperback.

This attractive and carefully prepared little book is an excellent introduction to the amphibians of a state for which no other modern treatment exists. It aims at a general audience while retaining features of value to professional students of the Amphibia.

The meat of the book consists of Family Accounts (12 of them) that place the relationships and ranges of Missouri forms in a broader, world-wide context; and individual Species Accounts (40 of them) that includes an excellent black and white photograph (about 4 inches wide), a Description (coloration, sexual differences, size range, other distinctive features that aid identification), Habits and Habitat, Breeding, Subspecies (geographic variation in Missouri) when appropriate, Remarks, and Missouri Distribution of species and subspecies with a small, but quite suitable, map showing presumed range (shading) and verified localities (county dots). Particular effort was made to be sure the nomenclature and range maps accurately summarized current knowledge. Also included are a Table of Contents (by common and zoological names), and Introduction (containing a brief explanation of classification and zoological nomenclature and descriptions of physiographic provinces in Missouri related to geographic distributions of certain species), a Checklist of Missouri Amphibians (by common and zoological names, arranged by family), illustrated taxonomic Keys to the species identification of adult specimens (should also work for most postmetamorphic juveniles as well), a discussion of possible occurrence of 6 additional species in the state, a short Glossary, a good Bibliography (175 entries), and a useful Index to zoological (by generic and specific epithets) and common names (by all permutations: e.g., eastern gray treefrog is listed under "eastern," "gray," and "treefrog."

Johnson's considerable skill in drawing and photography have been used to excellent advantage. For anyone interested in the identification, distribution, and natural history of amphibians in Missouri, this book is a must.

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THE AMPHIBIANS OF MISSOURI. By Tom R. Johnson with illustrations by the author. The University of Kansas Publications, Museum of Natural History. ix + 134 pp.

The task of familiarizing and educating a public which is largely ignorant and often afraid of herptiles becomes a larger and more important challenge for professional herpetologists as natural environments and their inhabitants continue to be abused. What protective legislation exists is frequently useless unless the general public as well as the professional can recognize and respect protected wildlife.

At first perusal, Tom Johnson's Amphibians of Missouri may appear as a fieldbook outsized by Conant's A Field Guide to Reptiles and Amphibians of Eastern and Central North America and preceded in format and general purpose by Collins's Amphibians and Reptiles in Kansas. With such comprehensive materials already available, why publish a more limited, localized book?

In a time when demands for relevance sound more and more like the battle cry of the decade, a book which focuses information in a meaningful way for people in a particular region plays an important role in public education. People may be more likely to read about amphibians in their own state than about amphibians and reptiles in a larger or different region. Once drawn to the book, they will not be disappointed, for Johnson has taken great care to make his book both readable and enjoyable. He avoids technical terms or defines them in a glossary and clearly explains basic concepts and presents background materials in the introduction to the book. Individual species accounts include a description, notes on habits and habitats, breeding, additional remarks, and information about the animal's Missouri distribution. His work is thorough and should satisfy most professional readers without overpowering amateurs and the general public.

One feature which makes this book especially delightful is that its author is an artist as well as a scientist. Johnson's sketches and photographs illustrate the text beautifully and one can only hope that sales of the book will soon justify a second edition in color.

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A BIOGEOGRAPHICAL ANAYSIS OF THE CHIHUAHUAN DESERT THROUGH ITS HERPETOFAUNA by David J. Morafka, 1977. Biogeographica, Volume 9, viii + 320 pp. 95 Dutch Guilders (about $39).

Morafka's published version of his Ph.D. dissertation sets out to make the study of biogeography a rigorous analytical science. He proposes an explicit methodology for the study of biogeography in which the data are not combined with the analysis, thus avoiding the teleology inherent in many biogeographical analyses. For the system under study, Morafka attempts further rigor of analysis by proposing models which are then tested. The success of this approach will be evaluated after consideration of certain criticisms.

There are 10 pages of explanations for explicit taxonomic decisions on the generic or species level for 32 taxa. The following comments are representative, not exhaustive.

A biogeographical analysis is not the place to offhandedly revise the genus Eleutherodactylus. Morafka offers his opinion on this topic with respect to Hylactophryne. Acceptance of Hylactophryne would not change the analysis as presented and would have been consistent with current taxonomic usage.

On page 72, Morafka devotes a paragraph to arguments why Callisaurus, Cophosaurus, Holbrookia and Uma all should be considered as congeneric. I assumed that they would be so treated in the rest of the book. Not so. One is left wondering why the topic was raised.

There are three instances involving taxonomic problems that are not dealt with in the section set aside for that purpose. (1) As a footnote on page 80, Cnemidophorus dixoni is synonymized with C. tesselatus. Why was this action not explained on page 73 where C. dixoni is mentioned as a taxonomic problem? (2) Throughout the analysis, Sceloporus cautus plays an analytic role as it is endemic to the Chihuahuan desert. On page 199 in the discussion section on the historical biogeography of the Chihuahuan herpetofauna, S. cautus is essentially synonymized with S. undulatus. Why is the synonymy mentioned in the discussion? Unfortunately, an answer comes all too readily to mind. In the analysis section, S. cautus supported the distinctiveness of the Chihuahuan herpetofauna. On page 199, however, in the particular subregion of the Chihuahuan desert that S. cautus is endemic to, the Saladan Desert, Morafka argues against the Saladan as a desert glacial refugium. This time, endemics in the Saladan Desert would not support the argument and S. cautus is the only endemic in the Saladan Desert. (3) The one taxon that needed discussion, if any

did, is Rana pipiens. Morafka makes no mention of the taxonomic status of this form in his study area and uses the name R. pipiens throughout. Of the two or three species of this complex in or bordering the area under study, none is pipiens!

I found the book difficult to read because of the author's style of writing. It has a pomposity usually found only in dissertations and the pages of the American Naturalist or recently, Systematic Zoology. While the Guru can enlighten the flock in the short papers of the Naturalist, or a graduate student's excesses overlooked in a dissertation, the same style irritates in book length format.

Apparently, Morafka did not rewrite his dissertation for publication, but added new information by liberal use of footnotes. The most serious problem this approach caused is on page 179, where the paleogeographical discussion in the text is stated to be incorrect in a footnote based on the most recent evidence. For the high price asked of this book, I think the author should have revised the text throughout to incorporate the changes required by the 3-year interval from dissertation to submission of the manuscript for publication.

The literature citations I am familiar with are poorly handled. Morafka cites an article by Heyer and Savage, reversing the order of the authors as published and reversing the initials of Heyer. McDiarmid fares even worse. His name is variously spelled McDiarmid and MacDiarmid. The dates cited for McDiarmid's master's thesis are given as 1964 (pp. 168, 179) and 1965 (p. 182) in the text, while the literature section cites the date (correctly) as 1966. As the only two papers I am familiar with before reading Morafka's book have errors associated with them, I have not cared to check any other citations for fear that the rest of the literature is equally poorly treated.

The production of the volume itself has detractions. There are enough typographical errors or production errors to be distracting to the reader (including a typo in the title on the title page). The most serious error is apparently where a press-on letter fell off Map 6, page 122, where the number 5 indicating the Tamaulipan Province is absent from the map. The most frustrating production problem is the quality of the maps. Maps are the heart of any biogeographical analysis and the quality of reproduction of the maps in the two copies of the book I have seen is plainly poor. The central map in terms of methodology, analysis and interpretation is Map 2, page 62, the base map of the Chihuahuan desert. Desert is supposed to be clear, non-desert stippled. Those distinctions are not visible in the figure.

The criticisms levelled here may appear harsh. Perhaps that is because if a study professes to be rigorous, I expect rigor throughout, including attention to details. What I find in this study is a pretension of rigor overlying recurrent sloppiness. That irritates me. I distrust the validity of the rigorous analysis because of the sloppiness of presentation.

If the pretentiousness of approach and sloppiness of presentation are overlooked, the basic biogeographical synthesis is credible. The study is indeed a synthesis which provides a better understanding of the Chihuahuan desert. Morafka examined the specimens himself; he constructed the range maps; he defined the area under study on the basis of criteria meaningful to the herpetofauna, not on the basis of political boundaries; he synthesized ecological parameters with the biogeographic construct. In these terms, the study is to be commended; many biogeographic studies lack most of these qualities.

The study stands as an eminently successful dissertation. We should have been spared the foibles acceptable in a dissertation in the published version, however. In terms of dollars, buy the book only if you are specifically interested in the herpetofaunal biogeography of the Chihuahuan desert; borrow it for any other interests.

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Hemidactylus garnoti (Indo-Pacific Gecko). Female with 2 eggs; note the regenerated tail. This specimen was collected on a store in Hobe Sound, Martin County, Florida. It appears that this population was introduced by a landscaping outlet located next to the collection site. The female was captured 13 Nov. 1977 and laid 2 eggs 25 Nov. 1977. This species is triploid and parathenogenetic. Photograph by Robert Parelius. Specimen collected and photograph submitted by Steven Meyers.

Legislative Alert

Final Rulemaking Actions

Drymarchon corais couperi (eastern indigo snake) has been listed as Threatened in a final rulemaking issued by the U.S. Fish and Wildlife Service (effective 3 March 1978).

Parts of two southeastern Texas counties (Bastrap and Burleson) have been designated as Critical Habitat for the Endangered Bufo houstonensis (Houston toad) in another final rulemaking (effective 3 March 1978). In addition, the U.S. Fish and Wildlife Service is currently funding a status survey of the toad and its habitat needs in Harris County, Texas through the University of Houston.

In yet another final rulemaking (effective 6 March 1978) it was determined that Epicrates monensis monensis (Mona boa) and Cyclura stejnegeri (Mona ground iguana) are Threatened species and that their range--Mona Island, part of the Commonwealth of Puerto Rico--should be designated as Critical Habitat. Unique to Mona Island, the two reptiles are threatened by possible habitat modification and the presence of competitive and predatory feral animals.

Proposed Regulations

The U.S. Fish and Wildlife Service announced (F.R. Vol. 43, No. 76--Wednesday, April 19, 1978), a proposal to review the status of 16 species of herps on the U.S. Endangered List (see list below). These forms were placed on the Endangered Species List as a result of their presence in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. This review will provide information upon which a determination can be made as to whether any or all of these species should be reclassified as Threatened or entirely removed from classification under the Endangered Species Act. Comments should be submitted no later than 18 June 1978 (see address in next paragraph).

Critical Habitat has been proposed for Dermochelys coriacea (leatherback sea turtle) in the U.S. Virgin Islands (F.R. Vol. 43, No. 57--Thursday, 23 March 1978). Although the leatherback has been a listed Endangered species since 1970, critical habitat has not been determined. This proposal would make the Sandy Point Beach area on the western end of the island of St. Croix subject to full protection under Section 7 of the Endangered Species Act of 1973. Public comments close 22 May 1978. Please

submit comments to: Director, Office of Endangered Species, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

In response to a request by the Environmental Defense Fund, the public comment period on the proposed regulations to list the green, loggerhead, and Pacific ridley sea turtles as Threatened and to prescribe certain protective provisions, had been extended until 17 April 1978 by the National Marine Fisheries Service (F.R. Vol. 43, No. 59--Monday, 27 March 1978).

State News

On 7 April 1978, Georgia State Game and Fish Officials proposed a review of the status of the American alligator (Alligator mississippiensis) which may result in the removal of the species from that state's Protected Species list. In addition, Georgia officials proposed a review of the status of the gopher tortoise (Gopherus polyphemus) which would place the tortoise on the state's Protected Species list as an "Unusual species"--meaning the tortoise would receive complete protection under Georgia's Endangered Wildlife Act of 1973.

Comments on these two proposed actions are being actively solicited from the public; send your comments to: Ron Odom, Game and Fish Division, P.O. Box 119, Route 2, Social Circle, Georgia 30279, or by phone to 404/557-2532.

THOMAS J. BERGER, Museum of Natural History, The University of Kansas, Lawrence, Kansas 66045.

As noted in the Federal Register (42(229): 60743-60745), the Fish and Wildlife Service announced that the Atlantic salt marsh snake (Nerodia fasciata taeniata) is a Threatened species. This action makes the protection provided by the Endangered Species Act of 1973 available to this unique species. Determination of Critical Habitat has not yet been made.

Herpetologists and the Pan American Convention

On October 12, 1940, Secretary of State Cordell Hull signed the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere on behalf of the United States. This little known treaty has been ratified by most member countries in the Organization of American States. However, the implementation of the provisions of the Convention has been spotty at best and often ignored. This situation may soon change as the 17 member states review their international treaty obligations as a point of national pride and responsibility. Indeed, the United States is also reviewing this treaty as a prelude to active implementation and participation in its provisions. Executive Order 11911 of April 13, 1976, gave the Secretary of the Interior the responsibility for carrying out its provisions and in his environmental message of May 23, 1977, President Jimmy Carter proposed implementation now through the Organization of American States and offered to host an inter-American conference (possibly in 1979).

Most herpetologists have never heard of the Pan American or Western Hemisphere Convention, as it is called. Yet, with the increasing recognition that it is receiving in some Latin American countries, it would seem desirable to call attention to and highlight the main provisions of the Convention. Although a broad range of regulations are called for, each country so far has provided protection and restrictions according to its own established or newly enacted legislation. At present, species listed on the Annex to the Convention receive no specific legal protection in the United States, nor have regulations regarding permit procedures, if required in light of already existing procedures, been outlined for importation or exportation.

The main purposes of the Pan American Convention are to: 1) identify and preserve all species and genera of native flora and fauna in sufficient numbers over an area extensive enough to prevent their extinction, 2) protect and preserve areas with "scenery of extraordinary beauty, unusual and striking geologic formations, regions and natural objects of aesthetic, historic or scientific value, and areas characterized by primitive conditions...." and 3) provide a means "to effectuate the foregoing purposes...."

Article I of the Convention deals with definitions of national parks, national reserves, nature monuments, strict wilderness areas, and migratory birds. An important provision of this Article is that it allows a nature monument to be set aside for a single species. Article II requires member countries to explore the possibility of establishing national parks and reserves, nature monuments, and strict wilderness reserves, and to establish such areas as soon as possible. Article III states that contracting governments shall not alter park boundaries and that the resources of set-aside natural parks shall not be subject to exploitation for commercial profit. Hunting, killing, capturing, and destruction of native fauna and flora is prohibited except under direction of park authorities or for "duly authorized scientific investigations." It also stipulates that public recreational and educational facilities be provided. Article IV involves similar regulations for strict wilderness reserves.

Article V of the Pan American Convention requires member countries to enact laws for the protection of natural areas and their fauna and flora. Provisions for collection of specimens of fauna and flora for scientific study and investigations are specifically called for. In addition, this Article states that member countries should enact legislation designed to protect scenery and geologic features. Article VI calls for inter-American cooperation while Article VII deals solely with migratory birds.

Article VIII is probably the main area of concern to those involved in research in herpetology because it involves the protection of individual species (Annex to the Convention). This Article is reprinted in its entirety.

Article VIII

"The protection of the species mentioned in the Annex to the present Convention is declared to be of special urgency and importance. Species included therein shall be protected as completely as possible, and their hunting, killing, capturing, or taking, shall be allowed only with the permission of the appropriate government authorities in the country. Such permission shall be granted only under special circumstances, in order to further scientific purposes, or when essential for the administration of the area in which the animal or plant is found."

A list of amphibians and reptiles on the Annex to the Convention by O.A.S. member countries is provided in Table 1. It might be noticed that there is repetition in the list; some individual species are listed at the same time an entire genus or family is listed. This is because there have been several lists to the Annex published by various countries, and it is not clear whether the countries meant later species lists to supercede previous lists or merely to add to that country's original list.

Article IX states that member countries should take whatever measures necessary to control and regulate the importation, exportation, and transit of protected fauna and flora. Measures which might be taken to implement this Article include the issuing of certificates authorizing exportation or transit of protected species and the prohibition against importation of any species unless accompanied by a certificate establishing that the species was lawfully taken within the country of origin. Articles X,

XI, and XII govern the internal workings of the Convention (effective dates, membership, procedural matters).

It is not known at present how the U.S. will implement the Convention, nor which governmental agency would have responsibility for overseeing the provisions of the Convention. As such, the impact of the Pan American Convention on herpetologists is open to question. Should, however, the Convention be actively enforced by the United States, it would be hoped that all segments of the scientific community be consulted prior to implementation to insure that the best interests of the species involved be considered.

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ACKNOWLEDGMENTS

I would like to thank Bruce MacBryde for critically reviewing this manuscript and offering suggestions and literature references.

Table 1. Species listed by O.A.S. member countries in the Annex to the Convention.

ARGENTINA
- Boa constrictor constrictor
- B. c. occidentalis
- Clelia clelia
- Geochelone carbonaria
- Caiman latirostris
- C. yacare

BOLIVIA
- Phryniscus (=Bufo) nigricans

BRAZIL
- Anura-all species
- Bufo marinus
- B. paracnemis
- Ceratophrys cornuta
- C. dorsata
- Boidae-all species
- Caiman crocodilus crocodilus
- C. latirostris
- C. yacare
- Chelidae-all species
- Iguanidae-all species
- Kinosternidae-all species
- Melanosuchus niger
- Paleosuchus palperosus
- P. trigonatus
- Pelomedusidae-all species
- Podocnemis cayennensis
- P. dumeriliana
- P. expansa
- P. lewyana
- P. sextuberculata
- P. unifilis
- P. volgi
- Teiidae-all species
- Dracaena guianensis
- Tupinambis duseni
- T. nigropunctatus
- T. teguixin
- Testudinidae-all species
- Geochelone carbonaria
- G. denticulata

COSTA RICA
- Caiman fuscus
- Crocodylus acutus

CUBA
- Crocodylus acutus

DOMINICAN REPUBLIC
- Bufo marinus
- Hyla sp.

ECUADOR
- Amblyrhynchus sp.
- Conolophus sp.
- C. subcristatus
- Testudinidae-all Galapagos species (Geochelone sp.)
- Geochelone elephantopus

MEXICO
- Ambystoma mexicanum
- Caiman crocodilus chiapasius
- Caretta gigas (C. caretta)
- Crocodylus acutus
- C. moreletii
- Dermochelys coriacea
- Eretmochelys imbricata
- Gopherus agassizi
- Lepidochelys kempi
- Terrapene coahuila

PERU
- Boa constrictor
- Caiman latirostris
- C. yacare

UNITED STATES
- Alligator mississippiensis
- Bufo exsul
- Chelonia mydas mydas
- Clemmys muhlenbergi
- Crocodylus acutus
- Hyla andersoni
- Typhlomolge rathbuni

URUGUAY
- Caiman latirostris

VENEZUELA
- Hyla sp.
- Crocodylus intermedius
- Podocnemis expansa

C. KENNETH DODD, JR., Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

NEW HERP BOOK

"How Reptiles and Amphibians Live" by Arthur C. Echernacht. Elseiver-Phaidon, Mayfield House, 256 Banbury Road, Oxford, OX2, 7DH, England. 142 pages. 130 plates (125 in color). $8.75. (No U. S. distributor listed.) An excellent book with many fine color photographs. Highly recommended as a companion volume to the Time-Life series and Peterson Field Guides.

SALVADOR TO MADRID

Alfredo Salvador, formerly Resident Museum Specialist at Carnegie Museum of Natural History, has returned to Spain and taken a position in the Departamento de Zoologia, Facultad de Ciencias, Universidad Autonoma de Madrid, Cantoblanco, Madrid, Spain. He would appreciate continued exchange of reprints with American colleagues.

NEW RECORDING OF FROG CALLS

The Florida State Museum announces the availability of a new phonograph record on Florida frogs. It presents recordings of all commonly heard frogs and toads in Florida and is narrated by Linda Becker. $4.00. Order from: Florida State Museum, University of Florida, Gainesville, Florida 32611.



Herpetological Husbandry

Chemosensory Searching for Wounded Prey by Rattlesnakes is Released by Striking: A Replication Report

It has been demonstrated that chemosensory processes mediated by the vomeronasal system are most important for directing exploratory and predatory behaviors in natricine snakes (see Burghardt, 1970, for a review of the literature). (1) Presentation of a cotton swab saturated with odoriferous prey substances has been shown to activate food-seeking (e.g., orienting, tongue flicking) and attack responses in neonatal and adult garter snakes (genus Thamnophis), indicating that visual cues are probably unnecessary for the release of either appetitive or consummatory behaviors (Burghardt, 1969). Under some conditions, rattlesnakes are also able to detect potential prey by odors alone (Cowlers and Phelan, 1958), but visual cues arising from prey (esp. movement) have been found to be most important for the release of striking in both rattlesnake genera (Taylor, 1976). Consequently, the vomeronasal system appears to be of little significance during the initial phases of rattlesnake predation (orientation, approach, and strike). In fact, Chiszar and Radcliffe (1976) showed that, prior to striking, rattlesnakes emitted few tongue-flicks, whereas after striking, tongue-flick frequency increased significantly and was sustained at elevated rates until the commencement of swallowing. It was, therefore, hypothesized that chemical cues are not required until after the rattlesnake strikes prey, and that some aspect(s) of striking (sudden input of odor cues directly into Jacobson's organs, proprioception, etc.) activates the tongue-flick system. This chemosensory process then aids the rattlesnake in trailing its prey which might have wandered several meters away before dying (see also Baumann, 1927, 1928 and Dullemeijer, 1961).

Even though Chiszar and Radcliffe suggested that striking prey is the important factor in the activation of chemosensory searching in rattlesnakes, their study did not, in fact, demonstrate this because important controls were lacking in the experimental design. Specifically, no observations were made of hungry snakes which saw prey but did not have the opportunity to strike. If such a snake also exhibited a high rate of tongue flicking, then it would clearly be inappropriate to conclude that striking was the causative factor for activation of chemosensory searching. Accordingly, Chiszar, Radcliffe and Scudder (in press) exposed rattlesnakes to two conditions: (1) snakes saw, smelled and detected thermal cues arising from a mouse held just out of striking range for two seconds, and (2) same as condition 1 except that the snakes were allowed to strike the mouse at the end of two seconds. All mice were removed after the presentation period and all tongue flicks were recorded during the next 10 minutes. Only snakes in the second condition exhibited a sustained high rate of tongue flicking in the post-presentation period. Hence, striking was in fact necesary to activate chemosensory searching. In addition, once the rattlesnakes began to flick their tongues at a high rate, they ignored additional live mice (Chiszar, et al., Exp. 2). It was concluded that a successful strike (i.e., one which envenomates prey) accomplished two things: (1) it induced chemosensory searching and (2) it induced an inhibition against further strikes. Experiment I of the present report provides a replication of the strike-induced chemosensory searching phenomenon (SICS), and Experiment II provides a replication of the strike-induced inhibition of striking phenomenon (SIIS).

EXPERIMENT I

Subjects and Maintenance Conditions

Five rattlesnakes (Crotalus enyo enyo), which had been in captivity for six months, were observed in this experiment. All snakes were individually maintained in glass terraria (50 x 27.5 x 30 cm) kept at 26-28°C during the light period (0800-2200) and 22-24°C during the dark period. Each animal was fed one to three live adult mice every other week. The present observations were made just prior to a regular feeding session.

Procedure

The subjects were randomly divided into two groups: control (n=2) and experimental (n=3). Each snake was observed for five minutes prior to the presentation of a live mouse. The number of tongue flicks during this period was regarded as the baseline rate. Following the baseline period, a live mouse was lowered with forceps into the cage to allow the snake a brief period of inspection during which the mouse was held just out of striking range. Snakes of the control group were permitted to inspect the mouse for two seconds before the rodent was removed from the cage. Snakes of the experimental group were allotted equal time for inspection before being given an opportunity to strike the mouse; in every case, the mouse was struck immediately and was then removed from the cage. After presentation of the mouse, the number of tongue flicks was continuously recorded for a five minute period. These records were made with the aid of a hand-held, push button counter.

Results and Discussion

Figure 1 plots the mean number of tongue flicks as a function of minutes for the control (no strike) and experimental (strike) groups. Analysis of variance revealed a significant Group main effect ($F=27.6$, $df=1/3$, $p < .05$), indicating that striking increased tongue flicking above the rate seen in the control group. The significant Group x Period interaction ($F=16.8$, $df=1/3$, $p < .05$) indicates that the difference in tongue-flick frequency between the baseline period and the post-presentation period for the control group was not appreciable, whereas the experimental group displayed a large increase.

These data replicate our previous SICS finding. Visual, olfactory, and thermal cues arising from potential rodent prey are of little importance in activating chemosensory searching in rattlesnakes; it is the occurrence of the strike which initiates chemosensory searching. Of course, we restrict this conclusion to non-starved, well-acclimated captive rattlesnakes; whether or not a similar phenomenon occurs under natural

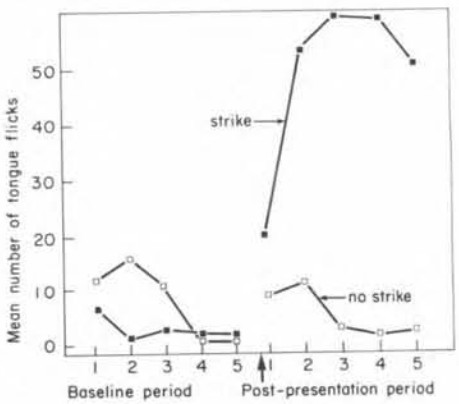


Figure 1. Mean number of tongue flicks during 5 minute baseline period and 5 minute post-presentation period for the control (no strike) and experimental (strike) groups. Subjects were five Crotalus enyo enyo. The numerical differences between groups during the baseline period were not statistically significant; the numerical differences during the post-presentation period were highly significant, especially between minutes 2-5.

conditions remains an empirical question.

EXPERIMENT II

Subjects

Twenty-three rattlesnakes (6 Crotalus viridis, 2 C. durissus, 2 C. vegrandis, 2 C. lepidus, 1 C. molossus, 1 C. atrox, 1 C. willardi, 1 C.catalinensis, 1 C. polystictus, and 6 Sistrurus catenatus) were subjects. All snakes had been in captivity for at least ten months and were maintained exactly as described in Experiment I. All of the present observations were made just prior to regularly scheduled feeding sessions.

Procedure

During each observation, two measures of attack latency were recorded. The first measure represented the time that elapsed from introduction of a live mouse to the time of the strike. The second measure was the latency to strike a second live mouse. For 16 snakes (Group A), the second mouse was introduced immediately after the first one was struck. For 7 snakes (Group B), the second mouse was introduced immediately after the first mouse was swallowed. Subjects were allowed a maximum of 300 seconds to strike any given mouse. If a snake did not strike during this period, the trial was terminated and a scale of 300 seconds was assigned. Successively presented mice were of similar size and color; all mice were from the same inbred strain (DBA) obtained from the Institute of Behavioral Genetics, University of Colorado.

Results and Discussion

Figure 2 shows the mean latencies for rattlesnakes to strike both the first and second mouse. The latency for rattlesnakes to strike the first mouse was always below 50 seconds and was usually less than 10 seconds. The latency of the second strike was considerably longer if the second mouse was introduced directly after the first strike (Figure 2a). A paired t-test comparing the latencies shown in Figure 2a was significant ($t = 11.52$, $df = 15$, $p < .01$). If the second mouse was introduced after the first mouse was swallowed (Figure 2b), the second strike latency was not different from the first ($t = 0.36$, $df = 6$, $p > .05$). For Group A, only 38% of the second-mouse presentations resulted in strikes within 300 seconds, whereas in Group B 100% of the second mice were struck ($\chi^2 = 7.4$, $df = 1$, $p < .05$).

The performance of Group A replicates the SISS phenomenon. These data strongly suggest that striking imposes a temporary inhibition on further striking of other prey that may be present.(2) The existence of this strike inhibition may help to focus the snake's attention on chemical cues for trailing, location, and ingestion of prey which has already been struck. The performance of Group B suggests that SIIS may be disinhibited by ingestion. However, the time that elapses during the ingestion of the prey might also allow for dissipation of the strike-induced inhibitory effect. Since approximately five minutes were required by Group B snakes to swallow their mice, it is possible that this temporal factor rather than ingestion is the critical variable in SIIS disinhibition.

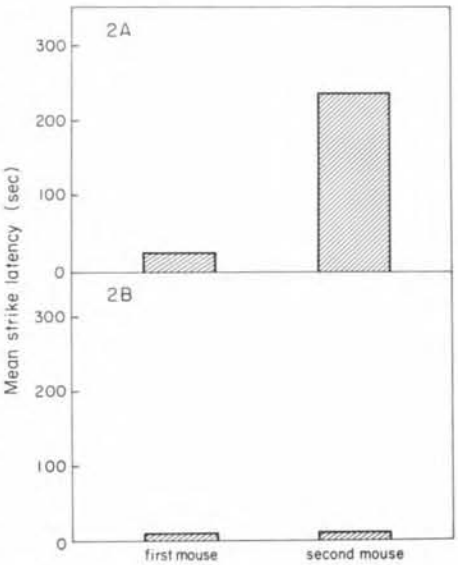


Figure 2. Mean latency to strike successively presented rodent prey. In 2A (16 snakes), the second mouse was introduced directly after the first was struck. In 2B (7 snakes), the second mouse was introduced directly after the first was swallowed (i.e., approximately 5 minutes after the first mouse was struck).

To discriminate between the effects of ingestion and passage of time on the disinhibition of SIIS, the following test is proposed. Rattlesnakes should be observed in two predatory situations. In one, the subject is presented with a mouse which it is permitted to strike and ingest before the introduction of a second mouse. In the second, the subject is given the opportunity to strike a mouse but then the mouse is immediately removed. This snake should then be "yoked" to the first subject with respect to the time it takes to ingest the mouse, before the second mouse is introduced. The dependent variable in both conditions would be the latency to strike the second mouse. A preliminary version of this study was conducted with 2 rattlesnakes (C. durissus culminatus) of similar age and size. The subject allowed to ingest the first mouse displayed the shortest latency in striking the second mouse (35 seconds vs. 162 seconds), suggesting that consummation of the predatory sequence by swallowing can actively disinhibit SIIS.

If sufficient time (about 20 minutes) passes after an initial strike, the SIIS effect will eventually dissipate and a second prey will be struck with a short latency, even though the first prey was removed before it could be swallowed (Chiszar, et al., Exp. 2). However, on the basis of Figure 2b and the data just reported, it appears that stimulation arising from the act of swallowing can result in more immediate disinhibition.

It appears that striking occupies a pivotal role in rattlesnake predation by releasing chemosensory searching and simultaneously inhibiting the release of further strikes. The dual effects of striking allow us to understand how components of the overall predatory pattern occur in a clear and regular sequence. The modal pattern consists of: (A) prey detection, (B) striking, (C) chemosensory searching, (D) location of the dead prey item, (E) location of the prey's head, and (F) swallowing of the prey head first. The reason that components B, C, and D rarely occur out of order is that B is a prerequisite for C; the occurrence of B and/or C then inhibits a reoccurrence of B and, thereby, increases the probability that D will occur. Once D occurs, E and F are likely to be facilitated since the snake will now be in the immediate presence of tactile cues associated with the dead prey.

Reptile curators from several zoos have reported (personal communication to CWR) that venomous snakes which have refused to feed can often be induced to do so if they can be forced to strike a mouse. This may be done by "teasing" the snake with a mouse until the snake strikes defensively. The predator then behaves as if the strike was based on predatory motivation: chemosensory trailing and ingestion occur more-or-less normally. This observation is understandable in light of our suggestion that the feeding sequence is a series of events with each increasing the probability that the next will occur. When a snake is forced to strike a mouse defensively, the keeper has broken into the series of events and the snake merely completes the sequence.(3)

FOOTNOTES

(1) The ophidian vomeronasal system consists of paired sensory organs (Jacobson's organs) located in the roof of the mouth. The bifid tongue brings molecules into the mouth and deposits them on the roof

from which they are drawn, probably by ciliary action, into the Jacobson's organs. Accordingly, tongue-flick rate can be used as an indication of vomeronasal sensory activity. Neural signals arising in these organs are conducted by the accessory olfactory nerves to the forebrain (nucleus sphericus; Halpern, 1976).

(2) It is important to keep in mind that our snakes were housed individually. Group housing can result in quite different behavior as snakes compete for prey items. We suspect that individual housing best approximates the natural predatory situation in rattlesnakes. Also, SIIS may be more effectively induced by a single strike in adult rattlesnakes than in young ones. Finally, there may be a negative correlation between "nervousness" and the extent to which SIIS is observed in particular individuals or taxa.

(3) This study was supported by the M.M. Schmidt Foundation. The authors also wish to thank the Mexican government for granting permits for the capture of Mexican species used in these experiments. Reprint requests should be sent to C.W. Radcliffe, Denver Zoological Gardens, City Park, Denver, Colorado 80205.

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An adult female Florida East Coast Terrapin (Malaclemys terrapin tequesta) taken near Titusville, Brevard County, Florida. The dorsal view shows an unusual (round) carapace shape. The ventral view shows an extremely compressed, shortened plastron. Both photographs by R.A. Seigel, Florida Technological University, Orlando. Exposure data: f16 at 125th second, Plus X film, ASA 125.

Reproduction of the Gray-Banded Kingsnake, Lampropeltis mexicana alterna

Reproductive data of the Gray-banded Kingsnake, Lampropeltis mexicana alterna are scant in literature. Gehlbach & McCoy (1965) noted five large eggs ready for oviposition in a specimen found on 16 May 1964. They averaged 12 mm x 30 mm. Tanzer (1970) reported on a clutch of six eggs laid by an alterna color phase collected on 26 June 1969. The eggs averaged 18.3 mm x 35.1 mm. The young averaged 255.4 mm total length and exhibited both alterna- and blairi color phases. Turner (1977) reported on two alterna hatching from a single egg. No further information on reproduction in this species appears to be available. This report deals with captive breeding, time the female carried the eggs, oviposition and incubation period of the eggs. The measurements of the young are also included.

The female L. m. alterna was received in July 1974, at which time the snake's length was 450 mm; her length at the time of writing was 915 mm. The 895 mm male has been in captivity since May 1975. The snakes are housed separately in 10 gallon Meta-frame slide-top reptile tanks. Newspaper is used for cage lining; room temperature varied from 24°C to 28°C prior to the snakes being placed together. Both snakes fed and were active all winter. The female was placed in the male's cage each night at 2000 hours on 1, 2 and 3 April 1976 and removed each morning. The male actively pursued the female around the cage; attempts to copulate were observed, but no actual copulation was seen.

The female shed on 8 May 1976 and refused food after this date. Her weight was recorded on 12 May 1976 at 227.1 grams. On 15 May 1976, the female was placed in a 5 1/2 gallon aquarium half filled with a mixture of three parts potting soil and one part water. The snake burrowed under the surface of the soil, forming a cavity which could be observed through the glass side of the cage.

At 17:10 hours on 17 May 1976, the female was observed coiled around a clutch of eight eggs. Seven eggs were adherent and white with a smooth texture. The egg which was not adherent was discolored and later proved to be infertile. An attempt to remove the eggs at this point resulted in a display of aggressive behavior by the female which included hissing and attempts to bite. At 19:30 hours, the snake had left the eggs and was crawling about the cage. At this point, all aggressiveness had disppeared and she was removed, weighed, and placed

in her normal cage; she immediately accepted a dead mouse. The female's weight was 139.6 grams.

The eight eggs were measured with a vernier caliper and weighed on a triple-beam balance. Egg diameter was 20 mm for each one; egg length varied from 37 mm to 43 mm (mean 39.8 mm) and clutch weight was 83.7 grams (Table 1).

The eggs were placed in a medium of vermiculite and water (Tryon, 1975) in a plastic box, which was kept on a desk near a window where it received daylight exposure; temperature within the box varied from 28°C to 32°C.

On 23 July 1976 after 66 days, the non-adherent egg collapsed; when opened, it proved infertile. On 25 July 1976, slits appeared in the remaining eggs. By 28 July 1976, all the hatchlings had emerged from their eggs.

The young were weighed on a triple-beam balance and measured by use of a string and plastic rule calibrated in mm. The weight of the young varied from 7.6 grams to 9.5 grams (mean = 8.6) and the length of the young varied from 250 mm to 270 mm (mean = 257.1 mm (Table II)). Ecdysis first occurred on 5 August 1976. All accepted pieces of lizard (Sceloporus, Uta and Eumeces; Sceloporus was preferred) or dead pink mice rubbed with a lizard. Shortly after their first meal, the hatchlings were induced to accept newborn mice either live or dead.

Table I - Measurements of Eggs

Length (mm)	Width (mm)
40	20
40	20
37	20
37	20
40	20
43	20
40	20
41	20

Table II - Measurements and Weight of Young

Length (mm)	Width (mm)
270	8.6
250	9.5
260	9.0
260	8.5
250	7.6
260	8.1
250	8.6

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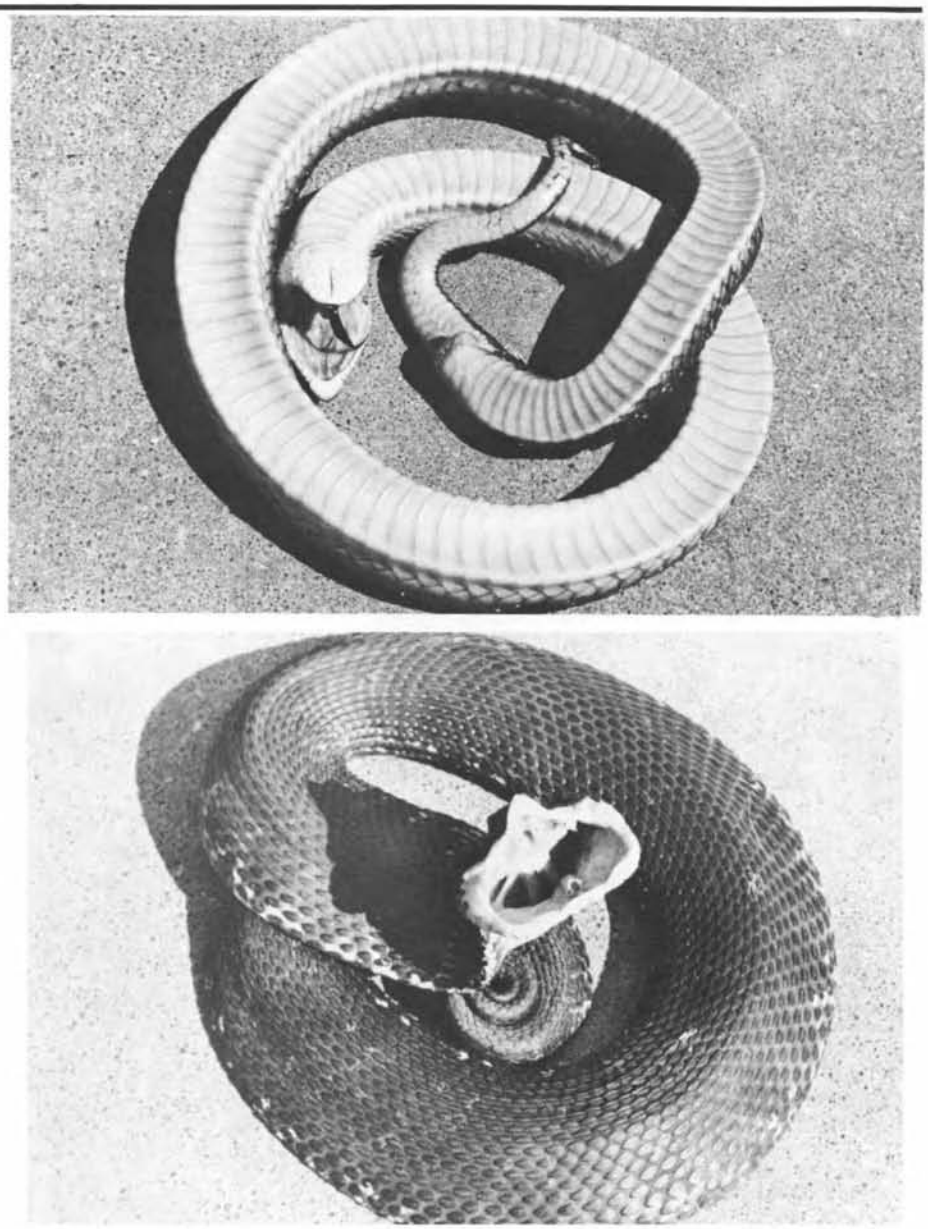
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An adult eastern hognose snake from near Garrett's Lake, Pottawatomie County, Oklahoma, engaging in "bluffing" and "death-feigning" behavior. Photographs by Jeffrey H. Black.

SPINY CHUCKWALLAS BRED AT THE FORT WORTH ZOO

The spiny chuckwalla (Sauromalus hispidus) inhabits Isla Angel de la Guarda and adjacent islands in the Gulf of California. On July 29, 1977, one of (our) specimens laid 21 eggs. Twenty of the eggs were incubated in a five-gallon aquarium on a substrate of vermiculite. Temperature was maintained at 32°C. Five eggs (three of which were fertile) were discarded within a few days due to infection. After 94-99 days incubation, 15 chuckwallas hatched.

This is believed to be a first captive hatching. Since little is known about the young or behavior of S. hispidus, we are looking forward to studying growth and ontogeny of behavior in this species. (G. Carl)

....from AAZPA Newsletter, 19(1): 5.

Some Aspects of Breeding and Raising Aquatic Chelonians: Part II

REPRODUCTION, EGG-LAYING AND HATCHING

Care must be taken to observe any type of courtship or copulatory behavior so that preparations can be made for egg-laying. Most aquatic turtles perform certain ritualized courtship activities (Barton and Price, 1955; Ernst and Barbour, 1972; Lardie, 1975, and many others). This may vary among taxa but is always initiated by a heightened general interest in females by the males. At most times of the year, members of the opposite sex are generally ignored. Captive conditions may or may not stimulate reproductive periodicity that corresponds to behavior in nature, so frequent observation is essential. Initial interest may result in one or more males following a female as she swims. Courtship patterns may be instigated by a male caressing the female with long claws of the forelimbs, as in certain Chrysemys and Pseudemys (Ernst, 1971), or by the male closely examining the head and vent of the female, as in Graptemys versa (personal observation), and Graptemys pseudogeographica (Ernst, 1974). Usually, if the female does not attempt escape or appears submissive to advances, copulation occurs. Some species, such as Clemmys muhlenbergi, may copulate regardless of the female's escape behavior (Tryon and Hulsey, 1977). A general copulation pattern for aquatic turtles has been described by Porter (1972). It should be noted that the male will occasionally nip at the female's neck during courtship and mounting. This can be severe, and it can be assumed that females with raw or cut dorsal neck skin have at least been pursued by a male. Copulatory durations observed at the zoo are short, lasting but several minutes for most species; however, several coital sequences may be observed in a single pair during a period of a few hours.

If a suitable nesting area is not provided, the female may retain the eggs which could be ruined once laid. Within several weeks after copulation, females will spend more and more time on land, most often in some secluded shelter or buried beneath material provided for oviposition. Sphagnum moss is perhaps the most suitable nesting material, and there should be enough to allow the females to burrow completely. Most often, a pan of appropriate size is filled with damp sphagnum and placed in the exhibit during the laying season, or kept year-around in off-exhibit enclosures as mentioned in Part II. Females of various species are often seen resting in or under the sphagnum and usually display little or no territorial behavior. If considerable territorial behavior is observed, more than one nesting area must be provided. Digging with alternating hind limbs is a good sign of imminent egg deposition (Punzo, 1975), as is continued burrowing beneath the nesting material. At this time, nests should be checked several times per day. Usually, those females that carefully lay their eggs in a nesting area produce fertile clutches. Conversely, eggs scattered about the enclosure, laid days apart, or laid in the water despite available nesting areas are almost assuredly inviable. Inviability, however, may be due solely to submersion in water (see Ragotskie, 1959; Plummer, 1976).

Once eggs are discovered, it is essential that they be removed from the nesting areas and incubated artificially. All eggs should be measured for length and width with calipers and for weight on a triple-beam balance. It is imperative that the eggs remain in the same position as laid. Careless handling can result in a suffocated embryo due to alteration of the air space within each egg. Immediately after measurements are recorded, eggs should be placed in a one-to-one ratio of ounces of vermiculite (expanded gypsum) to fluid ounces of water in well-sealed glass gallon jars or glass aquaria (Tryon, 1975). Ratios of six oz. to six oz. for one gallon jars and 20 oz. to 20 oz. for ten gallon aquaria seem ideal. I have used setups with a higher percentage of water with success, but an equal or slightly lower percentage of water is preferred. The eggs are spaced apart with their longitudinal axes parallel to the vermiculite surface. A gallon jar is suitable for two or three large (50-60 mm) eggs; they can be spaced out in rows in an aquarium. Each container should have a well-sealed lid. No additional moisture should be added throughout the duration of incubation. The lids should be removed for one or two minutes every two weeks to replenish the oxygen within the containers and then the containers should be resealed. Egg sites can be numbered on the sides of the jar and tops of the aquaria, but never mark the eggs themselves. Advantages of this method are: 1) eggs are visible and observable, 2) humidity level is established at the beginning of the process, and 3) there is no need to touch the eggs or change incubation materials. Incubation temperatures at the zoo vary seasonally. For eggs laid during the warm months, temperatures may fluctuate between approximately 23°C and 32°C with no apparent harm. During the winter, because of lowered available temperatures, eggs are placed in an incubator which maintains an approximate 30°C temperature. With lowered available temperatures, eggs may take an extended time to hatch (Yntema, 1960, 1964), and with extremely high incubation temperatures, dead or deformed young may result (Cunningham, 1939; Cunningham, et al., 1939; Vinegar, 1974). For most turtle eggs, 28°C to 32°C is preferred. Using this method, close to 100 percent of fertile eggs will hatch. It should be stressed that mishandling of eggs or submersion in water has invariably resulted in death of the embryos.

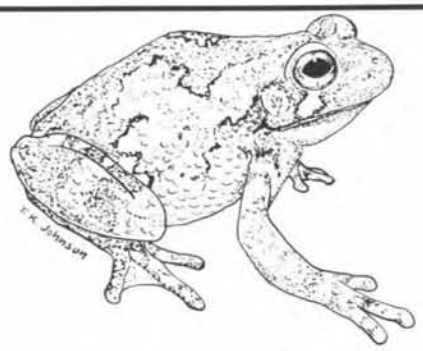
Pritchard (1967) stated that the incubation period for most species of turtles is two or three months. These periods recorded at the zoo have varied considerably although the incubation technique remained the same for all eggs. The shortest chelonian incubation period was 42 days for Clemmys muhlenbergi, and the longest was 155 days for the crowned hill turtle, Geoemyda trijuga coronata. In my experience, the average is 115 to 120 days, but these were mostly tropical or subtropical forms. It is naturally important for a turtle from a colder climate with shorter summers to have a short incubation period, and this may also hold true for tropical forms from regions exposed to frequent flooding or drought. There is also evidence that some fully developed neonates can overwinter in the egg or nest (Woolverton, 1963; Nemuras, 1967; Ernst, 1976), and as a result new hatchlings may be found in early spring. Another reason for varying incubation periods is the stage of development within the eggs at the time of deposition. Clemmys muhlenbergi embryos may develop to a large degree within the female's body, hence an extremely short incubation period. Also, fertilization within a single clutch of eggs may not occur at one time, and as a result, embryos may be in varying states of development when eggs are laid. This may have been the case with a clutch of three eggs incubated identically from a white-lipped mud turtle, Kinosternon leucostomum, for hatching occurred in 121, 137, and 149 days.

Fungus may develop on eggs for many reasons, but the most common are infertility and an overly moist hatching medium. Usually, infertile eggs will develop fungus within a couple of days to a week after deposition, but it may attack fertile

eggs during any stage of development after continuous exposure to excessive moisture. If this occurs, the eggs can be carefully taken out of the containers, wiped off with a damp cloth, and replaced in a dryer medium. If growth persists, application of a broad spectrum antibiotic salve such as Biotef (Upjohn Co.) or Forte-topical (Upjohn Co.) has been moderately successful in preventing further growth.

Reptile eggs, like poultry eggs, may be candled in order to determine fertility, although other methods exist (Quay, 1976). Several commercial poultry scanners are available; however, one can be easily made using a tin can and light bulb. Cut a small (1-2 cm) hole in the center of the sealed end of an opened can and place the can over a standard 100 watt light bulb. The eggs can then be backlit by placing them against the hole for a few seconds. If, after the incubation process is well along, there are no signs of solid material within the egg, it is most probably infertile. Those eggs which appear solidly dark and allow no passage of light probably contain developing embryos. The success of this method depends a great deal upon the point at which the eggs are candled. For example, at the Fort Worth Zoo, an entire clutch from Alligator mississippiensis was candled after 30 days of incubation, which is approximately one third of the total incubation time. It was thought that fertility could be determined at this point. Although none of the eggs showed obvious signs of fertility, almost all hatched after 90 to 100 days.

Hatchling turtles, like other egg-laying reptiles, possess an egg-tooth on the proximal edge of the snout with which they cut the shell prior to emergence. The head is moved vertically, horizontally, or rotated in a circular fashion with the sharp edge of the egg-tooth pressed against the inner shell lining. In most species with oval eggs, the young turtle will cut one end of the egg as it cannot turn around within the egg. In most circular eggs, such as those of Chelonia, Chelydra, or some tortoises, the slits may be more varied in location. Once the egg is opened the hatchling may rest for a period of several hours to several days before attempting further progress (Einem, 1956). It is a mistake to manually open the egg and extract the young turtle at this point. Usually, during the first stages of hatching there is some remaining yolk attached to the plastron. This may take several days to be absorbed, during which time the plastron will slowly close up and assume normal proportions. Chances of infection and stress are increased if the hatchlings are extracted before this occurs.



JUVENILE MAINTENANCE

Conditions of maintenance for newly hatched and juvenile turtles are necessarily more exacting than those for adults. Improper care during the first several months after hatching will usually mean the difference between a healthy, reproductively active young adult and one that is not. As soon as the young turtles escape the confinement and security of the egg, they should be carefully rinsed off in tepid water and placed in a gallon jar with damp paper towels. Temperature should not be much below or above that of incubation or thermal shock may occur. They should be left in the jar for 24 to 48 hours, depending upon the amount of unused yolk remaining. Measurements should be taken 24 hours after emergence for carapace length and weight using procedures described earlier for eggs. Because it is important to check development in appearance as well as growth, photographs should be taken at this time. Many chelonians begin to lose juvenile characteristics of color and shell contour after several weeks of feeding (Adler, 1960).

If yolk retention has been minimal, the turtles should be placed in a 19 liter aquarium, tilted so that dry and wet areas are provided, with approximately 2.5 cm water at the deepest point. Scattered sphagnum moss and small pieces of cork bark may be added for hiding. Certain species, such as Clemmys muhlenbergi, will spend most of the first couple of weeks hidden from view beneath the sphagnum in the water. Others, such as Geoemyda trijuga, are unintimidated and active. It is best to provide some areas for hiding for hatchlings of all species.If feeding and growth appear to be progressing normally after one or two months, the juveniles should be moved to a 38 liter aquarium where they will spend much of their first year. Small pea gravel is used as a substrate and should be sloped at one end for depth variation. Maximum water depth should vary from 5.0 cm to 7.5 cm depending on turtle size. Cork bark and rocks should be arranged for basking and hiding.

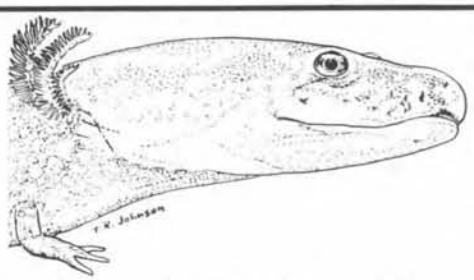
Each aquarium should be supplied with an airstone or power type filter. These filters can be lowered outside the tanks so that they will function with a low water level. Because such filters are capable of keeping the entire 38 liter tank relatively clean when full, maximum cleanliness can be attained with the reduced level. Each enclosure should be thoroughly cleaned once each week to ten days using tepid water, and filtering materials should be changed as necessary. Water temperature should be maintained at approximately 25°C, and the temperatures in the dry basking areas should vary seasonally from 25°C to 32°C, although a thermal gradient is preferrable at all times. Murphy (1973) stated that certain species of semi-aquatic turtles require relatively high levels of atmospheric humidity. Boyer (1965) indicated that there is considerable water loss during basking. With a higher humidity, this loss can be kept to a minimum. In addition, growth of some juvenile turtles increased significantly when humidity was raised to 95 to 100 percent in their enclosures (Zovickian, 1971). This can be accomplished by covering the aquaria with pieces of glass or clear plastic, but the use of these materials can eliminate essential ultra-violet radiation. Also, air circulation is severely reduced. At the zoo, increased humidity and provisions for lighting are accomplished simultaneously through the use of single 20 watt (two foot) Vita-lite (Durotest Co.) fluorescent tubes in reflectors that rest directly on and over the open tank tops and filtering tubes. These reflectors help to retain heat which increases the rate of evaporation, and because they cover approximately 75 percent of the open tops, humidity is raised considerably during the lighting cycle (0800-1730 h). Vita-lite tubes appear to supply the necessary ultra-violet radiation for hatchling and juvenile turtles and at the same time restrict the growth of harmful bacteria. As in the larger exhibits, daylight hours are generally extended through the use of clear skylights.

It is extremely important that a strict routine of feeding be established as soon as possible after hatching. Most species will begin to show feeding responses 24 hours after hatching. For approxiately the first six months after hatching, juveniles should be placed individually in small plastic bowls with just enough tepid water to cover the top of their carapaces. Bowl feeding is recommended for all species for several reasons. 1) Feeding outside the enclosure provides a degree of cleanliness otherwise impossible without almost daily water changes, and because of stress and high chlorine content (Murphy, 1973) this should be avoided. In addition, chances of disease are increased

when food items are introduced into the living area. 2) The amount of food consumed by each turtle can be closely checked. Appetite patterns can be established for each, and the amount of food can be decreased if obesity occurs or increased if growth does not seem satisfatory. 3) Many juveniles may refuse to feed because of intimidation by stronger and more aggressive tank-mates. Without competition, even the shyest individual will most probably consume a sufficient amount at each feeding. 4) Feeding usually stimulates defecation which is accomplished in the feeding bowls and not in the enclosure. 5) Even several non-aggressive juveniles in one feeding area can be a danger by biting or drowning one another. When it has been determined that several individuals will feed well together, they may be placed communally in larger containers.

Begin feeding most hatchling turtles on a three day per week schedule for the first month. At this time, they should be weighed and measured to compare with hatching size. If little or no growth is recorded, then feeding should be increased to five days in a row. Thereafter, measurements should be taken at monthly intervals. For example, three hatchling Geoemyda trijuga thermalis had mean measurements of 39.3 mm carapace length and a mean weight of 11.1 g. These turtles were maintained on a three day per week routine and grew to a mean carapace length of 80.0 mm with a mean weight of 80.0 g in one year. Growth was rapid, but each turtle maintained a normal appearance. On the other hand, two Clemmys muhlenbergi maintained from hatching to one year of age increased in carapace length and body weight from a mean of 24 mm/3.3 g, to 57mm/35.0 g on the five day per week diet (Tryon and Hulsey, 1977). Conversely, two other C. muhlenbergi were maintained on a three days per week schedule and increased from a mean 25.0 mm/3.5 g at hatching to a mean 31.7 mm/5.9 g after six months, at which time they were established on a five day schedule. Growth in length and weight increased considerably after the start of the seventh month. Ideally, growth should progress uniformly and increases of 3 to 5 mm with an equal weight increase in grams should be expected each month during the first year for many species reaching 100 mm to 200 mm adult carapace length. After the first year, growth may slow down considerably and become irregular.

Though there may be a dietary shift of food preferences in turtles from hatching to maturity (Clark and Gibbons, 1969), variety is the key to successful juvenile feeding. Turtles receive a different food item with each feeding and are normally fed until they appear full. Some species will consume their meals completely, others will feed and then remain inactive for some time before resumption. For this reason it is best to leave the turtle in the feeding bowl at least two hours with available food items. A typical five day schedule is as follows: Day 1 -- chopped mouse entrails; Day 2 -- small live crickets; Day 3 -- chopped fresh minnows; Day 4 -- live earthworms, chopped or whole, depending on turtle size; Day 5 -- turtle gelatin, as described in Part I. Occasionally, small fragments of the multiple vitamin Unipet (Upjohn Co.), which most species will eat unmixed and undissolved, should be added. Once feeding is completed, each turtle should be rinsed off in tepid water and placed back in its enclosure, where it will continue to forage. Foraging is constant preoccupation with juveniles in nature.



Once the juveniles reach 50 to 80 mm carapace length, they should be transferred to a larger aquarium, on or off exhibit. It is preferable to move them to a wooden box such as described in Part I for off-exhibit housing. These may vary in size, but all should provide the same conditions of temperature, lighting, basking and hiding areas. Additional space will allow for much more exercise, and this will usually stimulate an increase in growth. Also at this time, the juveniles may begin their seasonal indoor-outdoor cycles, and are well on their way to maturity.

CONCLUSION

Certainly, many other successful techniques for breeding and raising aquatic chelonians are in use, and some may be less time consuming and produce better results. This report cannot possibly cover all aspects of captive maintenance, nor does it pretend to be all-encompassing. With the simplistic set-ups of housing, lighting and feeding techniques described, it does, however, present a common sense approach for attaining the desired results. These techniques are presently in use at the Fort Worth Zoological Park, but are being improved continuously. Zoo personnel and individuals involved in the maintenance of captive chelonians have their own ideas and techniques that are being constantly shared. Perhaps eventually an ideal can be achieved.

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Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Conant (1975) or Stebbins (1966). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916. Short manuscripts are acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

CAUDATA

AMBYSTOMA LATERALE (Blue-Spotted Salamander). USA. CONNECTICUT: Hartford Co.: Bloomfield, 0500 meters N of Adams Road along Griffin Brook. 30 September 1973. R. Jones. Verified by B.W. Menzel. Univ. Connecticut Mus. Nat. Hist. nos. 6643-6645. Confirms presence of this species in Connecticut (Uzzell, 1967. Cat. Amer. Amph. Rept. 48.1)

Submitted by MICHAEL W. KLEMENS and ROBERT E. DUBOS, University of Connecticut Museum of Natural History, Department of Systematic and Evolutionary Biology, Biological Sciences Group, University of Connecticut, Storrs, Connecticut 06268.

ANURA

BUFO AMERICANUS CHARLESMITHI (Dwarf American Toad). USA. LOUISIANA: DeSoto Parish: Mansfield. May 1972. T.L. Hibbitts. Verified by W. Seifert. Dallas Mus. Nat. Hist, DMNH 4348. Extends known range into northwestern Louisiana (Conant, 1975 A Field Guide to Reptiles and Amphibians, Houghton Mifflin Co.). TEXAS: Red River Co.: 22.5 km NE Clarksville, Picina Farm. 15 May 1971. W. Seifert. Verified by W. Seifert. Dallas Mus. Nat. Hist., DMNH 804. Cranial crests more closely resemble Bufo valliceps having two preparotoids and relatively long parietal spurs, suggesting some intergradation with B. valliceps. (Raun & Gehlbach, 1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat Hist. Bull. No. 2).

Submitted by WAYNE SEIFERT, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226.

HYLACTOPHRYNE AUGUSTI LATRANS (Barking Frog). USA. TEXAS: Ward Co.: Pyote Air Force Base, Pyote. 1 May 1976. Collected by two members of the Texas Herpetological Society. Verified by W. Seifert. Dallas Mus. Nat. Hist., DMNH 4647. Collected in a sump pump hole in the machine room of the abandoned base. The surrounding area is flat and has red sandy soil with mesquite (Prosopis glandulosa) and creosotebush (Larrea divaricata) being the dominant vegetation. Numerous gopher (Geomys) burrows may be the only natural habitat for these frogs. This specimen is a link between the New Mexico and Texas specimens and its locality falls on the question mark of Conant's (1975. A Field Guide to Reptiles and Amphibians of Eastern and Central North America) range map.

Submitted by WAYNE SEIFERT, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226.

HYPOPACHUS VARIOLOSUS (Sheep Frog). MEXICO. AGUASCALIENTES: 13.5 km (by mex. 70) ENE Calvillo. 8 July 1977. D. Frost and S. Aird. Louisiana St. Univ. Mus. Zool., LSUMZ 36075-76. First record for the state of Aguascalientes and the most northern record in the Rio Juchipila drainage (Nelson, 1974, Herpetologica 30: 250-274). Associated species were Bufo occidentalis, Hyla eximia, Rana montezumae and Scaphiopus multiplicatus.

Submitted by DARREL FROST, Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70893, and STEVEN AIRD, Department of Biochemistry, Louisiana State University Medical School, New Orleans, Louisiana 70112.

TESTUDINES

DERMOCHELYS CORIACEA (Leatherback Sea Turtle). USA. CALIFORNIA: Ventura Co: Ventura. 2 September 1977. Skull deposited in Santa Barbara Museum of Natural History, SBMNH 1361. Carapace length 124 cm. First record for the county and supplements previous records in southern California (Van Denburgh, 1922, Occ. Pap. Calif. Acad. Sci., 10 (1-2): 1-611, 617-1028; Slevin, 1927, Copeia (159): 172-173; Lowe and Norris, 1955, Copeia (3): 256).

Submitted by FRED LOTTER, Biology Department, Ventura College, Ventura, California 93003.

SAURIA

EUMECES ANTHRACINUS PLUVIALIS (Southern Coal Skink) USA. TEXAS: Dallas Co: Oak Cliff, Dallas Zoo. 17 July 1975. D. Barker. Verified by J.R. Dixon and W. Seifert. Texas A&M University and Dallas Mus. Nat. Hist, DMNH 2268. Range extension of three counties east (Raun and Gehlbach, 1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist. Bull. No. 2).

Submitted by WAYNE SEIFERT, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226.

GERRHONOTUS LIOCEPHALUS INFERNALIS (Texas Alligator Lizard).USA. TEXAS: Dallas Co: Clarendon Dr. and Cumberland St., Dallas. 11 November 1973. J.B. Murphy. Verified by W. Seifert. Dallas Mus. Nat. Hist., DMNH 2210. The habitat is "typical" and could harbor an isolated population surrounded by the city although

no additional specimens have been collected (Raun and Gehlbach, 1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist. Bull. No. 2).

Submitted by WAYNE SEIFERT, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226. ●

HEMIDACTYLUS TURCICUS (Mediterranean Gecko). USA. FLORIDA: St. Lucie Co: Ft. Pierce. 21 September 1977. S. Myers and S. Phillips. Verified by W. Auffenberg, Florida State Mus., FLS/UF 40645-40649. 12 February 1974. J. Fallon, Florida Med. Entom.Lab Collection, uncatalogued. E.W. Campbell, no date, FSM/UF 40650. This locality lies 368.5 km south of the Jacksonville record (Meylan, Herp. Rev. 8(2): 39) and 202.7 km north of the Miami record (Barbour, 1936, Copeia 1936 (2). Ft. Pierce is a port of entry and this is undoubtedly how the population was introduced.

Submitted by STEVEN MYERS, Indian River Community College, Mueller Center, Lundberg Road, Vero Beach, Florida 32960. Mailing address: 705 Wall Street, Vero Beach, Florida 32960. ●

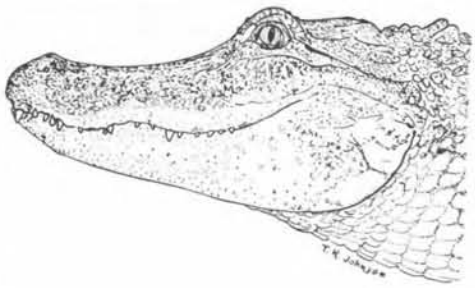
SERPENTES

CARPHOPHIS AMOENIS VERMIS (Western Worm Snake). USA. WISCONSIN: Grant Co: Nelson Dewey State Park, T3N, R6W, Sec 13, SW 1/4 of NE 1/4. 14 May 1977, 18 June 1977. R.A. Sajdak. Milwaukee Pub. Mus. Herpetol. Collection, MPM #14754, 15181. First record from Wisconsin. Nearest published localities are 235.3 km. S near Keosauqua, Iowa (Bailey, 1939, Copeia, 4: 218-219) and ca.255 km S in western Illinois (Smith, 1961. Illinois Nat. Hist. Surv. Bull. 28(1): 1-298).

Submitted by RICHARD A. SAJDAK, Zoology Department, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201. ●

MICRURUS LATICOLLARIS (Mexican Coral Snake). MEXICO. OAXACA: 4.3 km (by Mex. 125) NE Cuyotepeji. 16 June 1977. D. Frost and S. Aird. Louisiana St. Univ. Mus. Zool., LSUMZ 36213. First record for Oaxaca and the most eastern locality for this species. Our specimen extends the known range ca. 115 km SE of the nearest published locality, "probably Matamoros, Puebla" (Schmidt, 1958, Fieldiana Zool. 39: 201-212).

Submitted by DARREL FROST, Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70893, and STEVEN AIRD, Department of Biochemistry, Louisiana State University Medical School, New Orleans, Louisiana 70112. ●



Rhinocheilus lecontei tessellatus (Texas Long-nosed Snake). MEXICO. ZACATECAS: 2.7 km (by Mex. 70) SW Aguascalientes state line. 9 July 1977. D. Frost and S. Aird. Louisiana St. Univ. Mus. Zool., LSUMZ 36252. First record for southern Zacatecas, southernmost locality for the subspecies and a range extension ca. 175 km WSW of the nearest known locality, in San Luis Potosi (Medica, 1975, Cat. Amer. Amph. Rept.: 175.1-175.4) R.l. tessellatus is as yet unreported in either Aguascalientes or Jalisco but the proximity of this Zacatecas locality to both state lines insures the presence of this subspecies in those states.

Submitted by DARREL FROST, Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70893, and STEVEN AIRD, Department of Biochemistry, Louisiana State University Medical School, New Orleans, Louisiana 70112. ●

SALVADORA GRAHAMIAE LINEATA (Texas Patch-nosed Snake). USA. TEXAS: Robertson Co: 4.8 km S Franklin. 8 February 1970. T.L. Hibbitts. Verified by W. Seifert. Dallas Mus. Nat. Hist., DMNH 4312. Extends known range one county eastward and represents the most eastern locality for Salvadora (Raun and Gehlbach, 1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist. Bull. No. 2).

Submitted by WAYNE SEIFERT, Dallas Museum of Natural History, P. O. Box 26193, Dallas, Texas 75226. ●

SYMPHIMUS LEUCOSTOMUS (Mexican White-Lipped Snake). MEXICO. OAXACA: 11.2 km N La Ventosa. 21 December 1976. J.L. Knight and J.D. Johnson. Herpetology collection, Lab. for Env. Bio., Univ. Texas at El Paso. (UTEP; number to be assigned). Fills the geographic hiatus of ca. 130 km between the vicinity of Tehuantepec, Oaxaca and 15 km N Arriaga, Chiapas (Rossman and Schaefer, 1974, Occ. Pap. Mus. Zool.45: 1-12).

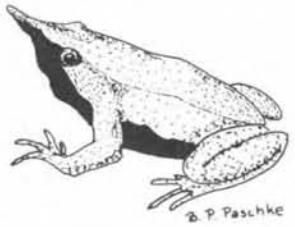
Submitted by JERRY D. JOHNSON, Department of Biology, El Paso Community College, El Paso, Texas 79904 and JAMES L. KNIGHT, Department of Biology, Emporia State University, Emporia, Kansas 66801. ●

SYMPHOLIS LIPPIENS MEXICO. JALISCO: 7.1 km SW Guadalajara bypass on Mex. 15 to Morelia (=ca. 10 km SW Guadalajara), San Jose de Tajo trailer park. Ca. 20 June 1977. Collected by a local resident. Verified by D. Frost. Louisiana St. Univ. Mus. Zool., LSUMZ 36217. The collector reported this species to be uncommon but seen occasionally after hard rains have forced them to the surface. First record for the vicinity of the type locality (Guadalajara) and the state of Jalisco since the species was described by Cope (Proc. Acad. Nat. Sci. Philadelphia 13: 524) in 1862 ("1861"). This specimen demonstrates that Sympholis lippiens penetrates into oak woodland and probably follows the more tropical barrancas into eastern Durango and southern Zacatecas.

Submitted by DARREL FROST, Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70893. ●

TYPHLOPS COSTARICENSIS (Costa Rican Blind Snake). NICARAGUA: Departamento de Metagalpa: San Jose de la Montana, near Ciudad Metagalpa, 1100 m. Dug out by bulldozer August 2, 1975, and collected by J. Villa. Verified by S. B. McDowell. Amer. Mus. Nat. Hist., #113546. The specimen is a female with empty but well developed right oviduct (left one absent); total length 262 mm (tail: 3.3). The locality represents the first documented record for Nicaragua and a range extension of ca. 280 km NNW from the type locality. The species was hitherto known from Monteverde, Costa Rica (Jimenez and Savage, 1962: Rev. Biol. Trop. 10: 199-203) and based on a single specimen; others are now available, making a total of 7: NICARAGUA: Matagalpa, no other data (Mus. Comp. Zool., Harvard, #9558, a badly mutilated specimen mis-identified as T. tenuis); COSTA RICA: Puntarenas Province; Monteverde, Sierra de Tilaran, 1500 m (Mus. Zool. Univ. Costa Rica #2215, 4362, 5229, and R.K. LaVal #3084). T. costaricensis was included in the Nicaraguan herpetofauna (Villa, 1971: Lista Tentativa de Vertebrados Inferiores de Nicaragua) on the basis of the MCZ specimen, but documentation was pending.

Submitted by JAIME VILLA, Department of Biology, University of Missouri, Kansas City, Missouri 64110. ●



Two Snakes, Leptophis modestus and Pelamis platurus, New to the Herpetofauna of Honduras

Recent work has demonstrated the presence of two additions to the list of snakes known from Honduras, as prepared by Wilson and Meyer (in press). These additions are described below.

LEPTOPHIS MODESTUS (GUNTHER)

On the evening of 31 May 1976, we collected a DOR specimen of Leptophis modestus (Gunther) at 1890 m approximately 22.5 km E Nueva Ocotepeque, depto. Ocotepeque in the Sierra de Merendon of extreme southwestern Honduras. The specimen (LSUMZ 33571) represents the first Honduran record of this species, recently resurrected by Hoyt (1964).

The Honduran specimen is a female with the following characteristics: ventrals, 180; anal plate divided; subcaudals, 168 (count approximate as tail is badly damaged); dorsal scale reduction formula 15-7(114) 133+4(115)11; supralabials 8-8, with 4th and 5th entering orbit; infralabials 10-10; loreal 1-1; preocular 1-1; postoculars 2-?; total length, 752 mm; tail length, 274; ratio of tail to total length, 0.364. All dorsal body scales are keeled, except for the outermost row, the degree of keeling decreasing gradually laterally. The color in life was green dorsally and pale green ventrally. The black postocular bar begins on the lower postocular and passes posteriorly along the lower portion of the anterior temporal and the upper edge of supralabials 6 and 7 onto the lower portion of the lower posterior temporal and upper portion of supralabial 8. The above description agrees well with that given for Guatemalan and Salvadoran specimens by Hoyt (1964) and the Mexican specimen by Williams and Smith (1966).

The Honduran specimen came from just below the point where the Carretara Occidente crests the Sierra de Merendon. The vegetation in this area originally was cloud forest (Lower Montane Moist Forest formation of Holdridge, 1964). Some patches of apparently undisturbed cloud forest exist there now but much has been destroyed and is covered with second-growth forest, pasture, and crop fields.

Leptophis modestus is now known to occur at moderate and intermediate elevations of both versants (not only the Atlantic versant, as stated by Williams and Smith, 1966; Cerro Monte Cristo, the mountain from whence came the Salvadoran specimens, lies on the Pacific versant, the Guatemalan locality is on the Atlantic versant, and the Honduran locality essentially straddles the Continental Divide) in three separate areas, as currently understood, in northeastern Chiapas, central Guatemala, and extreme northwestern El Salvador-southwestern Honduras. The data on elevation supplied for specimens discussed by Hoyt (1964) and Williams and Smith (1966) indicate a known range of 1335-2200 m. For reasons unclear to us, Williams and Smith (1966) gave a range of 1250-2250 m. The vegetational limits for the species are difficult to determine at present. No elevational or vegetational data are available for the Guatemalan specimen, although it apparently came from the Rabinal-Cubulco Basin feeding out of the middle portion of the Sierra de Chuacus, which was described by Stuart (1954) as being covered by a pine savanna with "short grasses and dry-land shrubs" in the more easterly portions. Williams and Smith (1966) implied that the Chiapan specimen came from a pine-oak forest, a type of vegetation common to the intermediate elevations (between 1000 and 1500-2000 meters, depending upon exposure) of the Central Highlands of Guatemala and Chiapas. Hoyt (1964) gave no indication of the type of vegetation from which the Salvadoran specimens came, but Uzzell and Starret (1958) described the area as covered by "virgin cloud forest," except where cleared for pasture. Essentially the same situation is to be found at the Honduran locality. The vegetation of the area has been characterized by Meyer and Wilson (1971) as Lower Montane Moist Forest (or, vernacularly, "cloud forest") and is illustrated by Meyer (1969, fig. 24). In summary, as best as can be presently determined, Leptophis modestus occurs in vegetation ranging from pine-oak at lower elevations to cloud forest at higher elevations.

Williams and Smith (1966) stated that Leptophis modestus "appears to be another indicator of the 'subhumid corridor' of Stuart (1954), where it inhabits the oak-pine forest zone." The apparent restriction of Leptophis modestus to humid forest types (Subtropical and Lower Montane Moist Forest formations) effectively exempts it from consideration as a subhumid corridor indicator species, in the sense intended by Stuart (1954).

PELAMIS PLATURUS (LINNAEUS)

During a study of the nesting sites of the Pacific Ridley (Lepidochelys olivacea) in Honduras in 1967, Peter C.H. Pritchard collected three specimens (UF 29075, 29215-16) of Pelamis platurus (Linnaeus) in the Gulf of Fonseca near the coastal town of Cedeno. These specimens represent the first records of the yellow-bellied sea snake in Honduras.

Pelamis platurus is widely distributed in the waters off the Pacific Coast of the Western Hemisphere. It has been previously recorded from all of the countries in Latin America that border the Pacific Ocean between and including Mexico and Ecuador, with the exception of Honduras (Kropach, 1975). The records from the countries of El Salvador and Peru (Hoge and Romano, 1971) appear to be unsupported by specimens from definite localities. Taylor (1951) mentioned its occurrence on Isla de Pascua (Easter Island), a Chilean possession. The occurrence of Pelamis platurus in Honduran marine waters thus was to be expected.

All three specimens are tricolored, but two of them (UF 29075, 29216) show dark spots in the ventral band (sensu Tu, 1976).

The specimens were found washed up on the beach at Cedeno, a small town on the coast of the department of Choluteca.

ACKNOWLEDGMENTS

We are grateful to Peter C.H. Pritchard of the Florida Audubon Society for alerting us to the existence and location of the specimens of Pelamis platurus.

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LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, Florida 33176, JAMES R. MCCRANIE, 10770 S.W. 164th Street, Miami Florida 33157, and LOUIS PORRAS, 12120 S.W. 180th Street, Miami, Florida 33177.

News Notes

Letters to the Editor

26 January 1978

According to an article published in the LA TIMES several weeks ago, several states have considered changing the 'skull-and-crossbones' symbol traditionally used on bottles containing poisonous substances to something which--to children--does not suggest "pirate food".

Several cities have experimented quite successfully with the symbol "Mr. Yuk!" -- the traditional smile button in a distinctly sour mood.

The State of Illinois, however, experimented with young children with other kinds of symbols, and, after suitable expense, showed that one symbol was more effective: a fanged green serpent.

Although I would not like to see youngsters poisoned any more than anyone else, I would also not like to see their minds poisoned by the substitute of phobia for reason. Every herpetologist has had occasion on which he or she has had to deal with the fear of snakes by those who do not know the reptiles, and we all know the difficulty of overcoming that superstititon, far more difficult in the case of snakes than with all other reptiles combined.

From the article, I judge that the state intends to implement the new symbol in the near future.

I believe that this action should be halted.

Were it the only effective way to save children's lives, I might not have misgivings, but I understand that the "Mr. Yuk!" symbol has been 100% effective in areas where it has been tested over a five year period. The green serpent symbol thus further lacks the economic pulse; will pharmaceutical companies produce a separate label for Illinois while so many states switch to "Mr. Yuk!"?

Would we today tolerate the pastiches of German and Japanese character which abounded in the comics produced during WWII? No. Nor do I think we should tolerate any symbiomythico framework which seems to lend credence to superstitions about any of the creatures who share our planet with us.

There are proven ways to discourage children from ingesting poisons which do not encourage them to think ill of an animal of demonstrable economic importance, an animal which herpetologists have defended for nearly a century against ignorance. I do not think we should lend support -- even through omission -- to that ignorance, but feel that this proposal should be actively opposed -- and to hell with the money!

DONALD E. AYRES, 5707 Harold Way #3, Hollywood, California 90028.

COLOMBIAN LIZARD PROJECT

Stephen Ayala is attempting the impossible--putting together a guidebook to Colombian lizards, having collected over 100 of the 150 or so described species.

He is painfully aware of the absence of the required understructure of numerous previous studies, but is trying to put together a set of photographs and descriptions of as many species as possible as a stimulus to further work. If you can help, please write: Stephen Ayala, Ph.D., c/o Tulane University ICMR, A.A. 5390, Universidad Del Valle, Cali, COLOMBIA.

SNAKE MIMICRY INFO NEEDED

Mr. K.R.G. Welch (123 Verbena Way, Worle, Avon BS22 0RW, ENGLAND) is preparing a summary of mimicry (of form, behavior or color in entire species or single specimens) in snakes. He wishes to hear from persons having pertinent data, informal notes or photographs, and would be grateful for any help.

REQUEST FOR INFORMATION

The newly formed Ministerio del Ambiente y de los Recursos Naturales Renovables (MARNR) of Venezuela is commencing a project entitled "Inventario Nacional de Fauna". The inventory will deal with the mammalian, avian, reptilian, and amphibian faunas. It is hoped that, after a year or two of field work, a series of distribution maps can be published in four volumes for the herpetofauna of Venezuela. The proposed volumes will include a bibliography as well as a list of localities covered by the MARNR, and will consist of: Snakes; Lizards and Amphisbaeneans; Crocodylia and Testudines; and Amphibians. At present we are compiling a list of locality records from the literature in order to assess which areas warrant the most attention. Steve Gorzula is in charge of the research into the herpetofauna, and would be grateful to receive information and correspondence. Of particular interest are articles that have been published in regional journals and newsletters, unpublished geographical distribution records, and information about collections of Venezuelan herpetofauna in foreign museums and institutions. Anyone who is able to assist us should write to: Steve Gorzula, MARNR, Div. Fauna, Centro Simon Bolivar, Ed. Camejo, pisol, #124, Caracas 101, VENEZUELA.

DATA ON SPERM STORAGE ABILITIES IN REPTILES DESIRED

For a detailed report on sperm storage abilities in reptiles, all kinds of information, data and observations on this subject are desired from any persons. Main interest is on lizards and snakes. Send replies by air-mail to: Matt E. Braunwalder, Finnsterrutistrasse 5, 8134 Adliswil, SWITZERLAND.

DATA AND INFORMATION NEEDED ON SCOLIOSIS/KYPHOSIS AND KYPHOSCOLIOSIS ON AMPHIBIANS AND REPTILES

Matt E. Braunwalder (address above) is preparing a comprehensive scientific study on scoliosis, kyphosis and kyphoscoliosis as well as other congenital bone deformations. One chapter will be dedicated to amphibians and reptiles. Therefore, he needs specific data, information and documentation on this subject illustrated with photographs or x-rays. Specific interests are: anamnesis; possible causes during gestation of egg clutches and in viviparous species; mortality rate; genetic or other transmittability; attempts and procedures of medical and operative treatments and its specific results; other statistics and data. If literature about this subject is cited, a photostatic copy would be appreciated. All data and information should be airmailed prior to October 31, 1978.

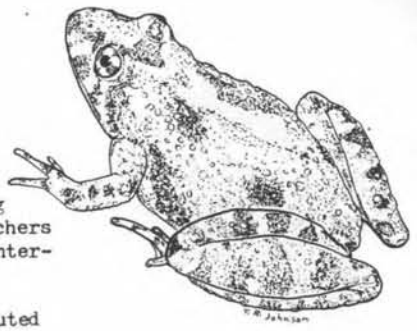
ERRATA FOR HR 9(1)

Page 13, col. 1, para 2, line 15: "nd" should read "and"

Page 15, col. 3, para 2, line 36: after "turtle," add "Geoemyda trijuga thermalis, white-lipped mud turtle,"

Page 15, col. 3, photo caption: add "Photo by John E. Simmons."

Current Literature



As of March, 1978, approximately 87 searchers are scanning 450 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

Richard D. Worthington
Current Literature
Department of Biological Sciences
The University of Texas at El Paso
El Paso, Texas 79968

A

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B

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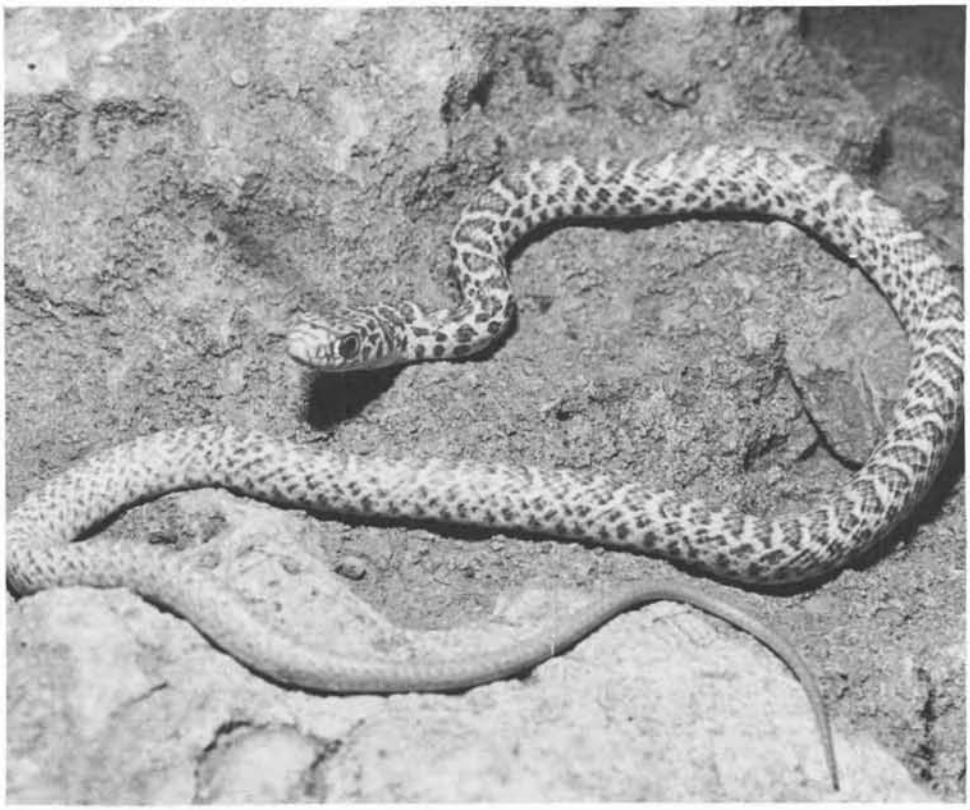
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Now in its tenth year, Herpetological Review remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the Journal of Herpetology -- see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Authors are urged to write the editors before submitting feature-length articles. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles are desired. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

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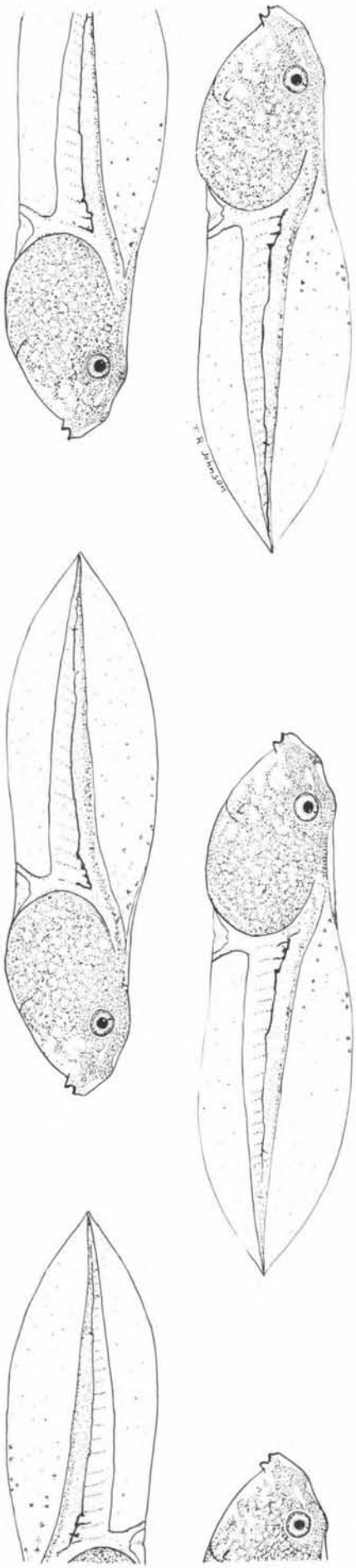
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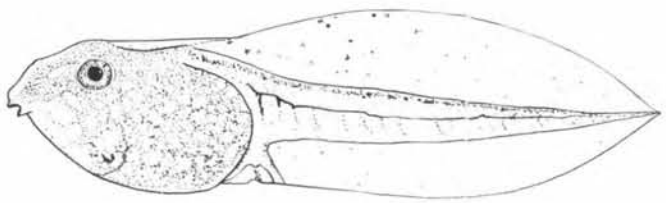


Herpetological Review

Volume 9 March 1978 Number 1

Contents

SSAR ANNUAL MEETING NEWS
SSAR 21st Annual Meeting at Tempe, Arizona 2
FEATURED INSTITUTION
Arizona State University, by M. J. Fouquette, Jr 3
FEATURE ARTICLES
Museum acronyms, by W. E. Duellman, T. Fritts and A. E. Leviton 5
Evidence for species specificity of pheromone trails in two sympatric gartersnakes, Thamnophis, by N. B. Ford 10
Litter size and parturition behavior in Sistrurus miliarius streckeri, by R. R. Fleet and J. C. Kroll 11
A note on the defensive posturing of turtles from Belize, Central America, by C. K. Dodd, Jr 11
BOOK REVIEWS
"North American Herpetology" by John Edward Holbrook. Reviewed by H. M. Smith 12
"Ontogeny and Phylogeny" by Stephen J. Gould. Reviewed by R. J. Wassersug 13
HERPETOLOGICAL HUSBANDRY
The captive care of hatchling tortoises, by R. L. Tremper 14
Some aspects of breeding and raising aquatic chelonians: Part I, by B. W. Tryon 15
Fatal toad poisoning in snakes, by F. Groves 19
LEGISLATIVE ALERT
Legislation and rulemaking re: Herps, by T. J. Berger 20
New endangered/threatened species 21
GEOGRAPHIC DISTRIBUTION
New records 21
REGIONAL SOCIETY NEWS
Second Regional Herp Society Conference at Tempe 23
Cincinnati Herp Society formed 23
NEWS NOTES 23
CURRENT LITERATURE 26
SSAR SYMPOSIUM TOPICS AT TEMPE 40
CONTRIBUTED PHOTOGRAPHS 40
ADVERTISEMENTS 41

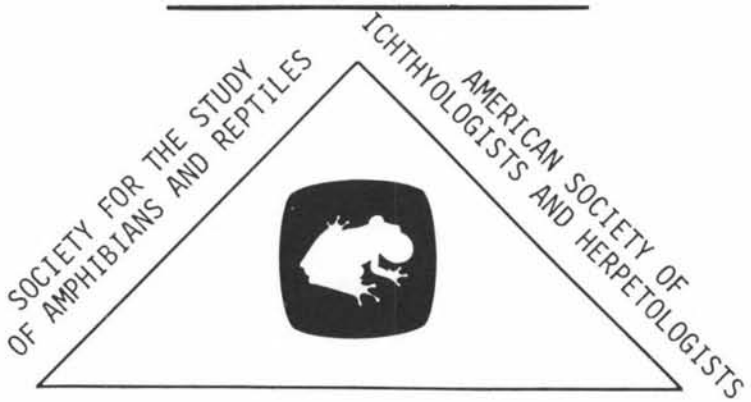


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Annual Meeting News



HERPETOLOGISTS' LEAGUE

Host

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Tempe, Arizona

31 May - 7 June 1978

31 May Wed - Registration begins + Society Board Meetings

1 June Thu - Contributed papers + Regional Societies Herp Conference (SSAR)

2 June Fri - Contributed papers + Symposium: Anuran Social Behavior (ASIH) + picnic

3 June Sat - Contributed papers + Amphibian Metamorphosis Conference
3 June Sat - Symposium: Herpetology in western North America (HL) + Social

4 June Sun - Field Trips

5 June Mon - Symposium: Biology of Damselfishes (ASIH)
5 June Mon - Symposium: Reproductive Biology of Captive Reptiles (SSAR)

6 June Tue - Symposium: Biology of Damselfishes (ASIH)
6 June Tue - Symposium: Reproductive Biology of Captive Reptiles (SSAR) + Banquet

7 June Wed - Special trips by arrangement, if sufficient interest.

GENERAL INFORMATION:

Pre-registration forms, including Call for Papers and other information, will be mailed to Society members in February. Copies will be sent on request to interested persons. Air-conditioned dormitories will be availale. Limited camping facilities will be available near Tempe.

Transportation: Air travelers should make reservations to Phoenix Sky Harbor International Airport. Economical limousine service is available from airport to campus or Tempe motels, or local committee will provide free transportation to and from airport if notified in advance of carrier and arrival or departure times.

Local Committee Chairman: M. J. Fouquette, Department of Zoology
Arizona State University, Tempe, AZ 85281
(602) 965-5070

Herpetology at Arizona State University

Arizona State University was established in 1885 in the town of Tempe, as the Territorial Normal School. Bills establishing both the school at Tempe and its sister institution in Tucson were signed the same day. When Arizona achieved statehood, in 1912, the name had become Tempe Normal School. In 1925, it became Tempe Teachers College, with a four-year curriculum, offering one degree, a Bachelor's in Education. In 1929, the school was further upgraded and the name was changed to Arizona State Teachers College at Tempe. In 1945, it became Arizona State College at Tempe and offered degrees in Liberal Arts, as well as education. The greatest enrollment seen at the modest institution up to that time was 882. Following World War II, enrollments began to rise dramatically. In 1949 over 4000 students were registered. In 1947, the name "Sun Devils" was adopted for the athletic teams, replacing the former "Bulldogs". In 1954, the institution was reorganized along university lines to include four colleges, but for political reasons the name remained Arizona State College. In 1958, the political barrier was broken by an unprecedented public referendum, with a 72% voter turnout, and the name Arizona State University was adopted by a 2 to 1 margin. In the 1977-78 academic year, ASU is the largest university in the state, with a registration well over 35,000.

Most of the buildings on the main campus (566 acres; Fig. 1) are less than 20 years old, but some of the older buildings remain. The Hayden Library houses over 1 1/2 million volumes (including a fine collection of classic and current herpetological literature). Other buildings include the modernistic, 3000-seat Gammage Auditorium (Fig. 2; last design of Frank Lloyd Wright), a large, well-equipped Memorial Union, and a 59,000-seat athletic stadium (currently being enlarged). There is an excellent art collection and a photographic gallery. The university also operates a PBS-affiliated television station, serving the Greater Phoenix area, along with five commercial TV stations. Off-campus, the university operates a field laboratory (experimental farm) on 320 acres near the main campus, and a continuing education facility (Camp Tontozona) near Payson, Arizona.

There are 11 colleges plus several special divisions and services. The Graduate College offers 13 Masters and three Doctoral degrees; included are the Master of Arts and Master of Science in 36 majors, and the Doctor of Philosophy in 17 majors (including zoology). Over 9000 students are currently enrolled in the Graduate School.



Figure 1. Aerial view of the main campus, Arizona State University.

The Department of Zoology is housed in the Life Sciences Center (over 150,000 sq. ft.), which it shares with the Department of Botany-Microbiology. About 62,000 sq. ft. are allotted to Zoology; over 4500 sq. ft. house systematic collections (herps, fishes, birds, mammals, insects, mollusc shells); 4000 sq. ft. are included in the Animal Resource Center. The new 7-level west wing (Fig. 3) contains many modern facilities, including an electron microscopy laboratory with both transmission and scanning instruments. Currently, Zoology has 32 faculty members. Research interests are strongest in ecology, but expertise in all areas of biology is well represented both in terms of research and course offerings. There are about 550 undergraduate majors in zoology and about 80 graduate (50 M.S., 30 Ph.D.). Department chairman is Dr. Ronald Alvarado, whose research is on ionic regulation in amphibians. Dr. M.J. Fouquette works primarily on anuran systematics and ecology (particularly bioacoustical aspects), and in other areas of environmental and systematic herpetology. His research is currently supported by a grant from the National Science Foundation and focuses on testing of reproductive and ecological character displacement among anurans, particularly spadefoot toads. He is also completing studies of South American treefrogs and southeastern U.S. chorus frogs. Dr. Fouquette has responsibility for the herpetological collection of approximately 20,000 specimens. Dr. James Collins is an ecologist who has studied evolution of life history patterns in anurans. Currently he is investigating environmental factors selecting for carnivorous morphs in Scaphiopus larvae, and environmental pressures influencing neoteny in Ambystoma tigrinum.

Research of several other members of the Zoology faculty bears on herpetology. Dr. Neil Hadley, an environmental physiologist, has studied bioenergetics of lizards in desert ecosystems, and the role of lizard and anuran integuments in water loss. Dr. Jerry Justus, a developmental biologist, is supported by a grant from the American Heart Association to study heart development and developmental genetics in the Axolotl, and also studies developmental rates in Scaphiopus and metamorphosis in Ambystoma tigrinum. Dr. Robert Ohmart directs the wildlife biology program and has interests in physiological ecology and ornithology, and has also done some ecological studies on herps, including a current program on the desert tortoise involving several



Figure 2. Grandy Gammage Auditorium.



Figure 3. Life Science Center, west wing.

graduate students. Dr. "Mink" Minckley is primarily an ichthyologist, but his studies have included work on reptiles and amphibians, especially in the Cuatro Cienegas region of Coahuila. Dr. Herbert Stahnke is retired and Professor Emeritus; he is known for pioneering application of cryotherapy to treatment of poisonous snake bite.

The Department of Zoology also has the endowed Maytag Chair in Vertebrate Zoology. Each year an outstanding vertebrate zoologist is invited to fill the Chair and offer a course or seminar, primarily to enhance the graduate program. Maytag Professors, from 1971, have been Ernst Mayr, Donald Tinkle, E. Raymond Hall, Robert Briggs, John Emlen, Allen Stokes, and Steve Fretwell. C. Ladd Prosser is Maytag Professor for Spring 1978, and James R. King will be Maytag Professor in Spring 1979.

Some recent recipients of graduate degrees in Zoology, involving herpetological thesis research, include: Laurie Vitt (Ph.D., 1976; lizard reproductive effort; currently on postdoctoral fellowship with P. Vanzolini in Brazil); Richard Van Loben Sels (M.S., 1976; reproductive ecology in Urosaurus; currently teaching high school in Phoenix); Joseph Mitchell (M.S., 1976; ecology of uniparental and biparental Cnemidophorus; now in Ph.D. program at Univ. of Tennessee); Nancy Dickson (M.S., 1976; hunting behavior in Hypsiglena); Marc Willner (M.S., 1977; numerical taxonomy of Bufo); Justin Congdon (Ph.D., 1977; bioenergetics of Sceloporus jarrovi; now on postdoctoral fellowship, Univ. of Michigan).

Some current graduate students with herpetological thesis projects include Maurice Renaud (Ph.D., systematic variation in Hyla wrightorum), Steve Wylie (Ph.D., ecology and behavioral thermo-regulation in Hyla arenicolor), Billy Jean Grounds (Ph.D., enzyme variation in uniparental and biparental Cnemidophorus), Judd Howell (Ph.D., effect of Rana pipiens larvae on algal communities), Tim Stevens (M.S., ecology of montane Cnemidophorus), Jamie Jenkins (M.S., post-feeding behavior in geckos), Dan Strecker (M.S., tapeworm infections in Coleonyx), Carl Price (M.S., karyotypic comparison of crotaline snakes), James Schwartzman (M.S., biotelemetry and ecology of Gopherus), Lauren Porzer (M.S., behavioral and physiological ecology of Heloderma), Judy Hohman (M.S., field studies of Desert Tortoises), Barbara Ewan (M.S., ultrastructure of developing axolotl heart muscle), and Robert Knox (M.S., physiological study of Rana catesbeiana larvae).

Arizona State University is in the city of Tempe (pop. 100,000). Tempe and the adjacent cities of Mesa and Scottsdale (also about 100,000 each) adjoin the east side of Phoenix (pop. over 1,000,000) and together comprise the main population center of Arizona. These cities lie in the Sonoran Desert in the Salt River Valley ("Valley of the Sun") of south-central Arizona, elevation about 500 m. The Phoenix Zoo is about 3 miles from campus. Phoenix Sky Harbor airport is within about 5 miles of the campus. Indian ruins, museums, recreational lakes (swimming, fishing, boating) and mountains are nearby. A bit farther are Flagstaff (150 miles) with Northern Arizona University and the Museum of Northern Arizona, the Grand Canyon (220 mi), Tucson (110 mi) with the University of Arizona and the Arizona-Sonora Desert Museums, and Mexico (Nogales, 175 mi).

Arizona State University and the Department of Zoology will host the joint annual meetings of the Society for the Study of Amphibians and Reptiles, the Herpetologists' League, and the American Society of Ichthyologists and Herpetologists, May 31-June 7, 1978.

M.J. FOUQUETTE, JR., Department of Zoology, Arizona State University, Tempe, Arizona 85281.

MUSEUM ACRONYMS

Prepared by
Electronic Data Processing Subcommittee
Herpetological Resources Committee

The Electronic Data Processing Subcommittee of the Herpetological Resources Committee is recommending the adoption of a standard set of acronyms to be used in citing museum specimens in technical publications. The Subcommittee has compiled a list of the world's museums and other research centers with holdings of amphibians and reptiles. It has also compiled a list of acronyms for each of these collections, drawn from the literature, from its own experience and from suggestions offered by colleagues.

In preparing the list that follows, the Subcommittee has been conservative, making few changes in the "accepted" list of acronyms, i.e. those of long-standing and which have appeared most frequently in the literature. In a few instances the Subcommittee has taken upon itself the responsibility of altering established acronyms where duplications between institutions exist. The following criteria have been applied in the selection of acronyms: 1) wherever possible the most commonly used current acronym has been retained [with attention being given to the selection of the most appropriate acronym among several alternatives that appear to be in current use for a single institution]; 2) in the event of acronym duplication, preference has been given to the retention of the acronym of the institution whose resources have been utilized more broadly and cited in the literature most frequently; 3) where modifications of existing acronyms were deemed necessary, the changes usually were limited to the addition of a single alpha-character to the end of the established acronym, the single character in most instances representing the first letter in the name of the city where the collection is housed.

During the last few years, several important collections of long-standing have been merged with other collections. For instance, the herpetological resources formerly maintained at Stanford University were transferred to the California Academy of Sciences where they are now permanently stored. Because the Stanford collections were frequently cited in the literature, its acronym is listed. An *'(X)'* follows the name of the institution, an indication that the collections are no longer at Stanford, having been transferred to one or more active resource centers. In a few cases a *'(Y)'* follows an institution's name, indicating a change in title only. Ownership and administration of the collections remain with the organization (e.g. the Chicago-based Field Museum of Natural History was formerly known by the name Chicago Natural History Museum).

The Subcommittee has tried to be consistent and changes have not been made without cause. Inasmuch as this list is presented here for comments and criticisms by the herpetological community, it should not be adopted as the final recommendation of the Subcommittee. Rather, your comments, including additions to the list, are solicited so that the Subcommittee can submit a final report that represents the consensus of the user community. Penultimately, although the preliminary report submitted herein for your perusal is not cross-indexed, the Subcommittee will include a cross-index in its final presentation. The cross-index will permit location of an acronym by institution, or visa versa, as well as by country and city.

Should you, as a potential user of this reference list, or as an individual directly concerned with any institution mentioned, wish to recommend emendations or additions, or have comments that would enable the Subcommittee to improve its presentation, please address your remarks to: *Dr. A. Leviton, California Academy of Sciences, San Francisco, California 94118 (USA).*

For the Subcommittee:
William E. Duellman
Tom Fritts
Alan E. Leviton

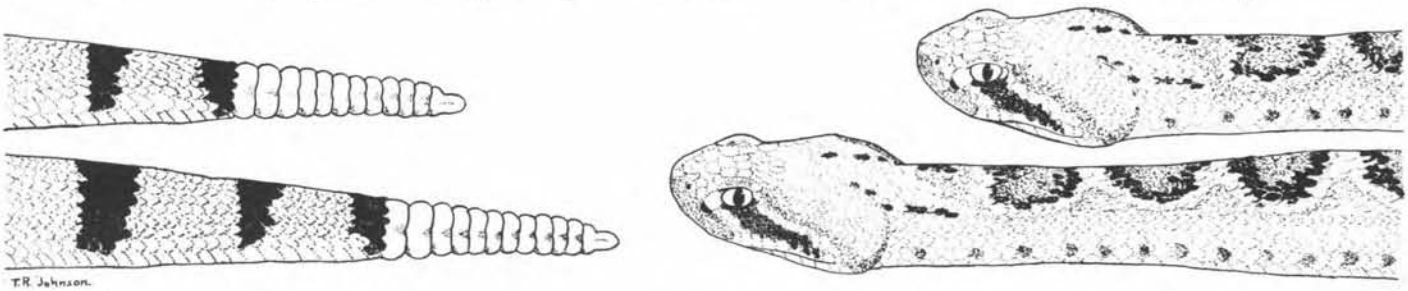
November 9, 1977

ACRONYM	INSTITUTION	CITY/STATE	COUNTRY
ALA	University of Alabama Museum of Natural History	Montgomery, AL 36104	United States
AM	Australian Museum	Sydney, NSW	Australia
AMG	Albany Museum	Grahamstown, CP	South Africa
AMNH	American Museum of Natural History	New York, NY 10024	United States
ANSP	Academy of Natural Sciences	Philadelphia, PA 19103	United States
ANU	Australian Nat'l University, Department of Zoology	Canberra, ACT	Australia
ASFS	Albert Schwartz	(Personal)	United States
ASSL	Academy of Science of St Louis	St Louis, MO	United States
ASU	Arizona State University	Tempe, AZ 85281	United States
AUM	Auburn University Museum	Auburn, AL 36830	United States
BAYUM	Baylor University Museum	Waco, TX 76703	United States
BM	British Museum (Natural History)	London, SW7	England
BMB	Bergen Museum	Bergen	Norway
BNHM	Bombay Natural History Museum	Bombay	India
BPBM	Bernice P Bishop Museum	Honolulu, HI	United States
BSM	Bureau of Science	Manila, Luzon	Philippines
BSNH	Boston Society of Natural History *(X)*	Boston, MA	United States
BUM	Zoological Museum	Bergen	Norway
BYU	Brigham Young University	Provo, UT 84601	United States
CAS	California Academy of Sciences	San Francisco, CA 94118	United States
CCB	Central College	Bangalore	India
CG	Carl Gans	(Personal)	United States
CHAS	Chicago Academy of Sciences	Chicago, IL	United States
CHINM	Instituto Nacional de Microbiologia	Buenos Aires	Argentina
CHM	Charleston Museum	Charleston, SC	United States
CM	Carnegie Museum	Pittsburg, PA 15213	United States
CMN	Coryndon Museum *(Y)*	Nairobi	Kenya
CMNH	Cincinnati Museum of Natural History	Cincinnati, OH	United States
CNHM	Chicago Natural History Museum *(Y)*	Chicago, IL 60605	United States
CNM	National Museum of Natural Sciences	Ottawa, Ontario K1A-0M8	Canada
COM	Colombo Museum	Colombo	Sri Lanka
CPS	University of Puget Sound	Tacoma, WA 98416	United States
CSNS	Cincinnati Society of Natural Science *(X)*	Cincinnati, OH	United States
CSTC	Colorado State Teachers College	Greeley, CO 80631	United States
CU	Cornell University	Ithaca, NY 14850	United States
CUB	Chulalongkorn University	Bangkok	Thailand
CZL	Centro de Zoologia	Lisbon	Portugal
DM	Dresden Museum	Dresden	Germany (DDR)
DMD	Durban Museum	Durban, Natal	South Africa
DSP	Fitzsimons' Snake Park	Durban, Natal	South Africa
DZVU	Dept Zool Vertebrados, Univ Uruguay	Montevideo	Uruguay
EBRG	Estacion Biologica de Rancho Grande	Maracay	Venezuela
EHT	Edward H Taylor *(X)*	(Personal)	United States
EI	Eugenio Izecksohn	(Personal)	Brasil
EPN	Escuela Polytechnica Nacional	Quito	Ecuador
FAS	Frederick A Shannon *(X)*	(Personal)	United States
FMNH	Field Museum of Natural History	Chicago, IL 60605	United States
FSM	Florida State Museum	Gainesville, FL 32611	United States
GML	Gorgas Memorial Laboratory	Canal Zone	United States
GUM	Universitats Museum	Gottingen	Germany
HM	Zoologisches Staatinstitute u Zoologisches Museum	Hamburg	Germany
HMS	Hobart M Smith *(X)*	(Personal)	United States
HUJ	Hebrew University, Department of Zoology	Jerusalem	Israel
HUN	Hunterian Museum	London	England
IB	Instituto Butantan	Sao Paulo	Brasil
IBM	Instituto de Biologia, Universidad Nacional de Cuyo	Mendoza	Argentina
IFAN	Institut Fondamental d'Afrique Noire	Dakar	Senegal
IM	Indian Museum	Calcutta	India

ACRONYM	INSTITUTION	CITY/STATE	COUNTRY
IML	Instituto Miguel Lillo	Tucuman	Argentina
INHS	Illinois Natural History Survey	Urbana, IL 61801	United States
IOC	Instituto Oswaldo Cruz	Rio de Janeiro	Brasil
IPN	Instituto Politecnico Nacional	Mexico City, DF	Mexico
IZAC	Instituto de Zoologia, Academia de Ciencias	Havana	Cuba
IZUA	Instituto de Zoologia, Universidad Austral	Valdivia	Chile
IZUC	Instituto de Zoologia, Universidad de Concepcion	Concepcion	Chile
JAP	James A Peters *(X)*	(Personal)	United States
JFBM	James Ford Bell Museum of Natural History	Minneapolis, MN	United States
JV	J D Visser	(Personal)	South Africa
KM	Kratow Museum	Krakow	Poland
KMK	Kaffrarian Museum	Kingswilliamstown, CP	South Africa
KNP	Kruger National Park	Skukuza, Transvaal	South Africa
KU	University of Kansas Museum of Natural History	Lawrence, KS 66045	United States
LACM	Los Angeles County Natural History Museum	Los Angeles, CA 90007	United States
LBSC	Long Beach State University	Long Beach, CA 90804	United States
LCFM	Musee de La-Chaux-de-Fond		Switzerland
LIHUBA	Universidad de Buenos Aires	Buenos Aires	Argentina
LBM	Landsmuseum Brunn	Brno	Czechoslovakia
LMK	Laurence M Klauber *(X)*	(Personal)	United States
LMM	Alvaro de Castro	Lourenco Marques	Mozambique
LSUMZ	Louisiana State University, Museum of Zoology	Baton Rouge, LA 70803	United States
MA	Awash National Park, Museum	Awash National Park	Ethiopia
MACN	Museo Argentino de Ciencias Naturales	Buenos Aires	Argentina
MAD	Madras Museum	Madras	India
MBL	Museu Bocage, Faculdade de Ciencias	Lisbon	Portugal
MBUCV	Museo de Biologia, Universidad Centrale	Caracas	Venezuela
MCNC	Museo de Ciencias Naturales	Caracas	Venezuela
MCZ	Harvard University, Museum of Comparative Zoology	Cambridge, MA 02138	United States
MD	Museu do Dundo	Dundo, Lunda	Angola
MFP	Museo Felipe Poey	Havana	Cuba
MHNG	Museum d'Histoire Naturelle	Ch-1211 Geneve-6	Switzerland
MHNM	Museo de Historia Natural de Montevideo	Montevideo	Uruguay
MHNV	Museo de Historia Natural de Valparaiso	Valparaiso	Chile
MJP	Museo de Historia Natural "Javier Prado"	Lima	Peru
MLP	Museo de La Plata	La Plata	Argentina
MLS	Museo de la Instituto de La Salle	Bogota	Colombia
MLU	Martin Luther Universitat	Halle-Wittenberg	Germany
MM	Magdeburg Museum	Magdeburg	Germany
MMK	McGregor Museum	Kimberley, CP	South Africa
MMTT	Muze-ye Melli-ye Tarikh-e Tabii	Teheran	Iran
MMUS	University of Sydney, MacLeay Museum	Sydney, NSW	Australia
MN	Museu Nacional	Rio de Janeiro	Brasil
MNCN	Museo Nacional de Ciencias Naturales	Madrid	Spain
MNCR	Museo Nacional	San Jose	Costa Rica
MNH	Musei Nationalis Hungarici	Budapest	Hungary
MNHN	Museo Nacional de Historia Natural	Santiago	Chile
MNHNM	Museo Nacional de Historia Natural	Mexico City, DF	Mexico
MNHP	Museum National d'Histoire Naturelle	Paris	France
MPEG	Museu Paraense "Emiliano Goeldi"	Belem, Para	Brasil
MPM	Milwaukee Public Museum	Milwaukee, WI 53233	United States
MRGS	Museu do Rio Grande do Sul	Porto Alegre, RGS	Brasil
MRHN	Institut Royal des Sciences Naturelles de Belgique	Brussels,B-1040	Belgium
MSNG	Museo Civico di Storia Naturale di Genova	Genova	Italy
MSNM	Museo Civico di Storia Naturale di Milano	Milan	Italy
MSNT	Museo Civico di Storia Naturale di Torino	Torino	Italy
MU	University of Missouri	Columbia, MO 65201	United States
MVZ	University of California, Museum of Vertebrate Zool	Berkeley, CA 94720	United States

ACRONYM	INSTITUTION	CITY/STATE	COUNTRY
MZB	Museum Zoologicum Bogoriense	Bogor, Java	Indonesia
MZGZ	Museo di Zoologia del Giardino Zoologico	Rome	Italy
MZTG	Museo de Zoologia	Tuxtla Gutierrex, Chiapas	Mexico
MZUF	Museo Zoologico dell Universita di Firenzi	Firenzi	Italy
MZUS	Universite de Strasbourg, Musee de Zoologie	Strasbourg	France
MZUSP	Museo Paulista *(Y)*	Sao Paulo, Sao Paulo	Brasil
MZUSP	Universidade de Sao Paulo, Museu de Zoologia	Sao Paulo, Sao Paulo	Brasil
MZUSP	Departmento de Zoologia, Secretaria Agricultura *(X)*	Sao Paulo, Sao Paulo	Brasil
NHM	Naturhistorisches Museum	Bern	Switzerland
NHMB	Naturhistorisches Museum	Basel	Switzerland
NHMG	Naturhistoriska Museet	Goteborg	Sweden
NHMW	Naturhistorisches Museum	Vienna	Austria
NHRM	Naturhistoriske Riksmuseum	Stockholm	Sweden
NMBO	National Museum	Bloemfontein, OFS	South Africa
NMK	National Museum	Nairobi	Kenya
NMM	National Museum of Victoria	Melbourne, Victoria	Australia
NMMH	North Manchurian Museum	Harbin, Manchuria	China
NMP	Natal Museum	Pietermaritzburg, Natal	South Africa
NMS	National Museum	Singapore	Singapore
NYSM	New York State Museum	Albany, NY 12207	United States
OUM	Oxford University Museum	Oxford	England
PU	Princeton University	Princeton, NJ 08540	United States
PUM	Universita di Pisa	Pisa	Italy
QM	Queensland Museum	Brisbane, Queensland	Australia
QVM	Queen Victoria Museum	Launceston, Tasmania	Australia
QVMS	Queen Victoria Memorial Museum	Salisbury	Rhodesia
RGMC	Musee Royal de l' Afrique Centrale	Tervuren	Belgium
RLM	Rhodes-Livingstone Museum	Livingstone	Zambia
RM	Raffles Museum	Singapore	Singapore
RMB	National Museum	Bulawayo	Rhodesia
RMNH	Rijksmuseum van Natuurlijke Historie	Leiden	Holland
ROM	Royal Ontario Museum	Toronto, Ontario M5S-2C6	Canada
RSM	Royal Scottish Museum	Edinburgh	Scotland
SAM	South African Museum	Cape Town, CP	South Africa
SAMA	South Australian Museum	Adelaide, South Australia	Australia
SCN	Sociedad de Ciencias Naturales La Salle	Caracas	Venezuela
SDNHM	San Diego Natural History Museum	San Diego, CA 92112	United States
SIBAC	Southwest Institute of Biology, Academia Sinica	Chengto	China
SJC	Stephen J Copeland	(Personal)	Australia
SMF	Natur-Museum Senckenberg	Frankfurt-am-Main	Germany
SMG	State Museum, Georgia	Ibilisi	USSR
SMK	Sarawak Museum	Kuching, Sarawak	Malaysia
SMNL	Staatliches Museum fur Naturkunde	Ludwigsburg	Germany
SMNS	Staatliches Museum fur Naturkunde	7000 Stuttgart-1	Germany
SMP	Surinaams Museum	Paramaribo	Surinam
SMW	State Museum	Windhoek, SWA	South Africa
STUM	Santo Tomas University Museum	Manila, Luzon	Philippines
SU	Stanford University, Natural History Museum *(X)*	Stanford, CA 94305	United States
SUM	Stellenbosch University, J R Ellerman Zool Museum	Cape Town, CP	South Africa
TAU	Tel Aviv University	Tel Aviv	Israel
TCWC	Texas Cooperative Wildlife Collection	College Station, TX 77843	United States
TM	Transvaal Museum	Pretoria, Transvaal	South Africa
TNHM	University of Texas, Natural History Museum	Austin, TX 78712	United States
TU	Tulane University	New Orleans, LA 70118	United States
UA	University of Arizona	Tucson, AZ 85721	United States
UAB	Universidad de los Andes	Bogota	Colombia
UAIC	University of Abidjan	Abidjan	Ivory Coast
UAM	Universidad de los Andes	Merida	Venezuela

ACRONYM	INSTITUTION	CITY/STATE	COUNTRY
UBL	Universite du Benin	Lome	Togo
UC	University of Colorado, Museum of Natural History	Boulder, CO 80302	United States
UCC	University of Cincinnati	Cincinnati, OH 45221	United States
UCLA	University of California at Los Angeles	Los Angeles, CA 90024	United States
UCP	Universidad de Cauca, Museo de Historia Natural	Popayan	Colombia
UCR	Universidad de Costa Rica	San Jose	Costa Rica
UDO	Universidad de Oriente	Cumana	Venezuela
UG	University of Ghana	Accra (Legon)	Ghana
UI	University of Ibadan	Ibadan	Nigeria
UIMNH	University of Illinois, Museum of Natural History	Urbana, IL 61801	United States
UK	University of Kentucky	Lexington, KY 40506	United States
UKS	University of Khartoum	Khartoum	Sudan
UL	University of Louisville	Louisville, KY 40208	United States
UM	Umtali Museum	Umtali	Rhodesia
UMF	University of Miami	Miama, FL 33146	Florida
UMKL	University of Malaysia	Kuala Lumpur	Malaysia
UMMZ	University of Michigan, Museum of Zoology	Ann Arbor, MI 48104	United States
UMP	University of Melbourne	Parkville, Victoria	Australia
UN	University of Nebraska State Museum	Lincoln, NE 68508	United States
UNM	University of New Mexico	Albuquerque, NM 87106	United States
UO	University of Oklahoma	Norman, OK 73069	United States
UP	University of Papua and New Guinea	Port Moresby	Papua
UPRM	University of Puerto Rico at Mayaguez	Mayaguez, PR 00708	United States
UPRPN	University of Puerto Rico at Piedras Negras	Piedras Negras, PR	United States
USC	University of So California, Hancock Foundation	Los Angeles, CA 90007	United States
USNM	National Museum of Natural History	Washington, DC 20560	United States
UTA	University of Texas at Arlington	Arlington, TX 76010	United States
UU	University of Utah	Salt Lake City, UT 84112	United States
UV	Universidad del Valle	Cali	Colombia
UZM	Universitetets Zoologiske Museum	Copenhagen	Denmark
UZMO	Universitetets Zoologiske Museum	Olso	Norway
WAM	Western Australia Museum	Perth, WA	Australia
WCAB	Werner C A Bokermann	(Personal)	Brasil
WTN	Wilfred T Neill	(Personal)	United States
WUM	University of Witwatersrand	Johannesburg, CP	South Africa
WVBS	West Virginia Biological Survey	Huntington, WA	United States
YPM	Yale University, Peabody Museum	New Haven, CT 06520	United States
ZIA	Zoological Institute, Academy of Sciences	Erevan, ASP	USSR
ZIK	Zoological Institute, Academy of Sciences	252150 Kiev-30, GSP	USSR
ZIL	Zoological Institute, Academy of Sciences	Leningrad, V-164	USSR
ZIUS	Universitetets Stockholm, Zoologiske Institut	Stockholm	Sweden
ZIUU	Universitetets Uppsala, Zoologiske Institut	Uppsala	Sweden
ZMA	Universiteit van Amsterdam, Zoologisch Museum	Amsterdam-C	Holland
ZMB	Zoologisches Museum	Berlin	Germany (DDR)
ZML	Leningrad State University, Zoological Museum	Leningrad, W-164	USSR
ZMM	Moscow State University, Zoological Museum	Moscow	USSR
ZSI	Zoological Survey of India	Calcutta	India
ZSM	Zoologische Sammlung des Bayerischen Staates	Munich	Germany



Evidence for Species Specificity of Pheromone Trails in Two Sympatric Garter Snakes, Thamnophis

Pheromone trails are used by social and semisocial animals to form aggregations for purposes of breeding, feeding or controlling environmental factors (e.g., humidity). In the cases of reproductive and feeding aggregations, it would be advantagious to a species to form a group of only conspecifics. The trail laid by an animal for these functions should therefore be species specific. Blum and his coworkers have recently examined trail followings in the social insects and have found that several species of ants and termites do show preference for conspecific trails (Barlin, et al., 1976; Blum, 1974). Trailing in snakes for purposes of reproduction or aggregation has been reported often in the literature (for review see Burghardt, 1970; Ford, 1976). Species specific mate selection does occur in snakes (Devine, 1976), however, no studies on species specificity of ophidian pheromone trails have been conducted.

While examining the mechanism and seasonality of trailing behavior in the western ribbon snake, Thamnophis proximus, and the red-sided garter snake, T. sirtalis, in Oklahoma (Ford, 1976), I found that these sympatric species showed little interest in each others females' trails. In view of the nature of these responses, a behavioral bioassay for species specificity of the trails was developed. Since I felt that a simple "Y" maze was not suitable due to the limited number of experimental animals available, a multi-choice (five-armed) test chamber (Fig. 1) was constructed. Ten tests utilizing four adult T. sirtalis males were conducted at the University of Oklahoma Animal Behavior Laboratory in June and October of 1975 (these months were active trailing periods; Ford, 1976). For each test, the following procedure was carried out:

1. The male to be tested was confined in box A two hours previous to the test (all letters refer to Fig. 1).

2. A conspecific and a heterospecific (one adult T. sirtalis and one adult T. proximus) female trail were laid on a fresh sheet of butcher's paper. Trails were prepared by inducing each female to crawl through a 14 cm wide bottomless tunnel placed on the paper.

3. The choice chamber was then placed on the paper so that each trail led from the opening in front of holding box A, into one of the five arms of the chamber. The arms to which each of the two trails led were chosen at random for each test.

4. Trapdoor B was then opened and the male allowed access to the chamber. The male could upon entering the chamber follow the conspecific's trail, the heterospecific's trail, or enter one of the three blank arms. One-way aluminum doors (C) trapped the male in the first arm he entered. The arms were checked after four hours and the location of the male recorded.

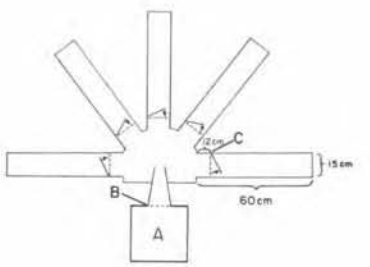


Figure 1. Multi-choice Test Chamber for Species Specificity of Thamnophis Pheromone trails. (A) removable holding box for male. (B) trap-door. (C) light weight aluminum one-way swinging doors (hanging from top, not the side as shown). The apparatus has no bottom and is positioned on a new sheet of butcher paper for each test.

Thamnophis proximus and T. sirtalis males chose arms with conspecific females' trails leading to them in 50% of the tests (Table I). If preferential selection of the arms did not occur, the males would be expected to end up in the conspecific arm 20% of the time (statistical tests were not conducted due to the low sample size). This does suggest that a preference for conspecific trails occurs in these two species in Oklahoma. In this study, 60% of the animals tested were found in arms with trails. In 85 observations of T. proximus and T. sirtalis in other trailing experiments (Ford, 1976), I found that during the active trailing months, males would follow the female's trail only 50 to 80% of the time. If choice chamber tests in which the male chose a blank arm are ignored here (the 40% expected nontrailers), then the males chose the arm with the conspecific trail in 83.3% of the trials. This supports even more strongly the species specific nature of these pheromone trails.

Test ♂ / Arm Choice	T. sirtalis	T. proximus
Conspecific ♀ trail	5	5
Hetero-specific ♀ trail	1	1
Blank (3 arms)	4	4

Table I. Trail Preference of Thamnophis Males in Multi-choice Test Chamber.

The western ribbon snake and the red-sided garter snake are sympatric in Oklahoma and are found in the same general habitat. If, as most observers of snake trailing behavior believe, the trail functions to guide the male to the female for breeding, it would be adaptive for the pheromone involved to be species specific. Males could thereby restrict their trailing to only females of their own species. This study is the first evidence of this species specificity of snake pheromone trails.

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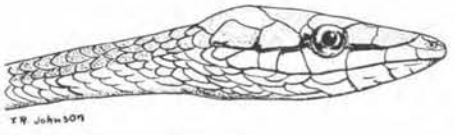
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Litter Size and Parturition Behavior in Sistrurus miliarius streckeri

Klauber (1956) reported on 15 "egg-sets" or "broods" of Sistrurus miliarius barbouri, ranging in number from 2 to 18 ($\bar{x}$=7.33±1.05), 2 of S.m. miliarius of 3 and 9, and 4 of S.m. streckeri of 4, 6, 6 and 7. Sabath and Worthington (1959) reported a S.m. streckeri bearing 5 young on 31 July. Carpenter (1960) recorded an unusually large litter of 32 born on 6 August. Clark (1963) reported on a litter of 3 male and 2 female S.m. streckeri born on 9 July. Finally Palmer and Williamson (1971) in their study of S.m. miliarius, reported length data for litters of 7 (n=1), 6 (2), 5 (8) and 4 (3) young born between 11 August and 8 September. Only Carpenter (1960) discussed parturition behavior. Herein we present length-weight data for two litters of S.m. streckeri and a detailed account of parturition behavior of one female and her offspring.

In the first instance, a gravid S.m. streckeri (SV=325 mm), Total length=380 mm, Wt=42 g) captured in Sabine Co., Texas on 23 August 1974 gave birth to 5 living young the following night. Neonates were measured and then preserved in the Stephen F. Austin State University Wildlife Collection. These young were the smallest neonates heretofore recorded (SV=95 mm, TL=102 mm; 98, 104; 95, 102; 92, 102; 98, 103).

A second S.m. streckeri (SV=355 mm, TL=410 mm, Wt=36.6 g) was observed in a loblolly-shortleaf pine (Pinus echinata and P. taeda) forest in Nacogdoches Co., Texas on 1 July 1976. This female was subsequently observed on 7 occasions within 2 m of its original location until 3 August, at which time she was taken to the laboratory. Between capture and parturition, she ate one adult ground skink (Scincella laterale). On 23 August, she produced a litter of 5, of which 2 were born dead (SV=140 mm, TL=161 mm, Wt=2.8 g; 141, 161, 2.5; 140, 158, 2.7; 125, 143, 1.6; 123, 141, 2.1). The two dead young were smaller than their living siblings and retained part of the external yolk sac.

The female was observed at 1804 hrs. with the first fetal sac partially protruding from her cloaca; it fully emerged one minute later. Young 2, 3, 4 and 5 were born 49, 30, 25 and 80 min. apart, respectively. The female remained coiled during labor and each birth was characterized by a series of from 8-19 undulatory contractions. These peristaltic contractions passed caudad through the posterior two-thirds of the female's body, generally beginning 2-5 min. apart and ending about 10 sec. apart. During contractions, the fetal bulge could be seen to move caudad. Near the end of the undulatory series, there was a series of up to five convulsive cloacal contractions and elevation of the tail. This was followed by emergence of the fetal sac which in three timed instances required 4, 3 and 3 min. Young moved their heads vertically and uncoiled from within the membranes. Subsequently, two young moved their heads from side to side in scraping movements against the female's body which lasted up to 25 sec. and continued at irregular intervals for 16 to 26 min. This behavior may remove mucus and debris from the mouth or loosen the natal skin. The fifth neonate had the shortest time between parturition and shedding and did not exhibit this behavior. Interspersed with the scraping behavior, the young gaped their jaws (1-4 times each) into a yawn-like position.

The female jerked, recoiled and occasionally lifted a coil slightly as the neonates touched her. Following scraping and yawning behavior, the neonates crawled out of the female's coil to other parts of the terrarium. After birth of the last young, the female uncoiled and for a 30 min. period crawled to approximately 5 cm of each living young several times and appeared to examine it by tongue flicking. She demonstrated no reaction to the two dead neonates.

Sloughing of natal skins required about two minutes subsequent to the skin being loosened around the head. Completion times for ecdysis were: 1 hr. 48 min. post-parturition for neonate number 2; 2 hr. 55 min. for number 3; and 1 hr. 35 min. for number 5.

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We thank D. L. Montgomery for recording the behavior notes and typing the manuscript.

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A Note on the Defensive Posturing of Turtles From Belize, Central America

Although there are considerable data available on various aspects of the behaviour of turtles, little has been published concerning the postures assumed by turtles when confronted by a predator. Dodd and Brodie (1975) have provided a brief review of turtle defensive behaviour and illustrated defensive posturing by the snapping turtle, Chelydra serpentina.

While in Belize, Central America, I had the opportunity to observe defensive posturing by several species of turtles. The first instance occurred 50 km northwest of Belize City on the road between the Northern Highway and the Altun Ha archaeological site and involved a Claudius angustatus (115 mm) crossing the road. Immediately upon my approach, the turtle leaned in my direction such that the carapace was directed at me. The legs and head were kept under the shell, and the posture was maintained by extension of both front and rear legs; the tail was not used to maintain balance as has been reported for Chelydra serpentina (Dodd and Brodie, 1975). When tapped on the frong or rear of the shell, the turtle redirected its posture toward the stimulus such that the carapace was always directed at it. While maintaining the posture, several very quick upward biting lunges were attempted. After several minutes of harassment, the turtle abandoned the posture and ran very rapidly in an attempt to gain cover. However, when its path was blocked, the posture was again assumed.

The second instance of posturing involved a Rhinoclemys areolata (110 mm) kept as a pet. When tapped on the side, this turtle also leaned in the direction of stimulation and vigorously used its rear legs to maintain balance and, if necessary, change direction. The head and front legs were kept well under the margin of the carapace and no biting attempts were made. Unlike the Claudius, the front legs were not used to maintain the posture when the turtle was tapped from the side; when tapped from the rear, the turtle ran instead of postured.

As a generality, the posturing observed in Claudius angustatus and Rhinoclemys areolata is similar to that of Chelydra serpentina (Dodd and Brodie, 1975), Chelys fimbriata (Neill, 1971), and Platysternon megacephalum (Pope, 1935). As Dodd and Brodie (1975) point out, many animals are known to expose a particular defensive surface to direct contact with a potential predator; it would appear that many species of turtles representing a number of families do likewise by directing the carapace toward the predator and drawing in the head and limbs beneath the shell. However, some species, such as Claudius angustatus and Chelydra serpentina, have added a sudden vicious biting lunge to their defensive repertoire. By having the head concealed under the carapace and suddenly thrusting it out and attempting to bite, the turtle may effectively injure a predator or at least startle it. Presumably, the possibility of being bitten would discourage a predator in future contacts with a posturing turtle.

ACKNOWLEDGMENTS

I would like to thank Mr. Tom Shaw for allowing me to observe the Rhinoclemys areolata and George Zug (National Museum of Natural History) for aiding in the identification of the turtles.

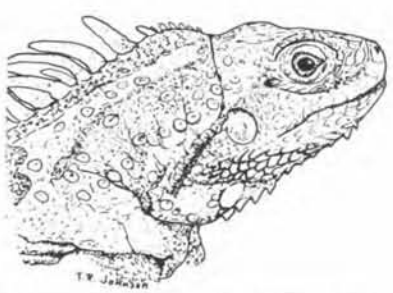
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Book Reviews

NORTH AMERICAN HERPETOLOGY, by John Edwards Holbrook. Society for the Study of Amphibians and Reptiles. 1976. xlix, 682 pp., 147 pls. (20 in color), clothbound. $60 (postpaid anywhere in the world from Dr. Douglas H. Taylor, Dept. Zoology, Miami Univ., Oxford, Ohio 45056).

Accustomed to a steadily intensifying information explosion over the past few decades, leading to dependence largely or entirely upon the most recent work as authority, most herpetologists are, either secretly or openly, likely to view the monumental reprint of Holbrook's second edition (1842) of North American Herpetology as of dubious significance. After all, so few have ever seen a copy of either edition, or had ready access to it, that perforce it was consigned to the oblivion that all exceedingly rare works share. And no doubt a goodly number of those who obtain a copy of the reprint do so more for its value as a collector's item than for its content.

A collector's item it is, without doubt, for it is a superbly executed reproduction of a monograph that itself set standards far beyond those of its time, and the original has been so rare as to command a price of $4000 in recent years. Attending for the moment to the workmanship of the reprint, it is an oversize (8.5 x 11 in., 21.5 x 28 cm) volume, 2.5 in (63 mm) thick, containing a reproduction of all 5 original volumes, including all of their 147 plates. By careful screening of a dozen or so copies of the original edition by the editor, Kraig Adler, the reprint includes all errata and additions noted in any of them, and in this respect is more complete than any one copy of the original, inasmuch as very few copies of the original are identical in all respects. The reprint differs from the original in having slightly smaller margins (although plates and text are of exactly original size), and in having most plates reproduced in black-and-white instead of color. However, 19 of the best plates representing all 5 volumes and all 5 major groups of herpetozoa (anurans, salamanders, turtles, lizards, snakes) were carefully selected for color reproduction. The paper is acid-free for maximum longevity (several centuries), and the whole is sewn and durably bound in library buckram.

The reprint was issued in 2 editions, totalling 1000 copies: 890 in the "regular" edition (some still available at this writing), and 110 in a "patron's" edition available only by advance subscription ($175). The latter is exquisitely bound. No expense was spared to make it match the style of Holbrook's original--no easy task today in America where binding by hand is virtually a lost art. Two of the most eminent book craftsmen in America (Trudi and Fritz Eberhardt, who, among many other honors, were commissioned to bind presentation sets of books given by U.S. officials to the Vatican, Queen Elizabeth II, Mao Tse-Tung and Chou En-Lai) were engaged to produce a binding with scarlet-red morocco leather spine and covers over genuine hand-marbled boards with 23-karat gold top edge and ornamentation (pure gold is not suitable for bindings intended for maximum endurance). In addition all patron's copies were accompanied by an unbound portfolio containing a set of all the color plates printed on oversize (10 x 13 in., 25.5 x 33 cm) sheets of heavy stock suitable for framing. Each book also is bound with a numbered colophon page bearing the signatures of the authors of the introductory sections.

Magnificent though the patron's edition certainly is, the workmanship in both editions is abslutely superb and a monumental credit to the notoriously meticulous skill of its editor.

A final touch of masterful planning scheduled the appearance of the reprint during the Bicentennial celebration, thereby constituting one of the more effulgent events of that year. It should be a matter of record that, although the patron's copies were not bound and mailed until 1977, the first copies of the regular edition were distributed in 1976, establishing that as the publication date.

The new introductory section of 49 pages conforms completely with the standards of excellence set elsewhere in the reprint edition. It includes a frontispiece of a color portrait of Holbrook by the deservedly and increasingly noted young artist David M. Dennis, designed as a collage especially for the reprint (a signed, dated and numbered copy is included in the unbound portfolio of the patron's version). A 3-page "Editor's Note" provides a background for the undertaking, with acknowledgments. A list of subscribers follows, constituting a sort of Who's Who in American herpetology: 90 individuals, excluding 3 from the Eastern hemisphere and 9 institutions or their libraries. A superb 15-page account of Holbrook's life and writings follows, by Richard D and Patricia H. Worthington. Another 15 pages are devoted to an analysis by Kraig Adler of all new taxa (39) described and named in all editions of Holbrook's 'North American Herpetology', giving the proper source citation, type-locality and location

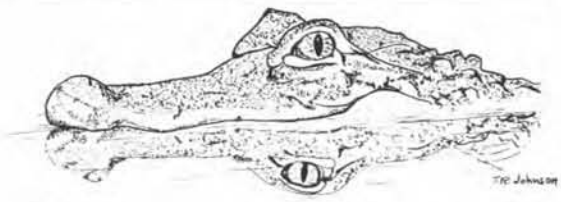
of types for each, often with illuminating notes. The introduction terminates with a 5-page tabular summary of the "Current Nomenclature for Scientifc Names in Holbrook's North American Herpetology including a Table of Contents," by Richard D. Worthington. A total of 150 species-group names used by Holbrook are dealt with.

In some ways the reprint is content-wise far more useful than a copy of one of the original editions, for it not only combines in one volume the textual variants of several original copies, but the introduction is an invaluable digest of all of the original editions. Because each copy of the original editions is unique (individually hand-painted and many bearing small variants of the text), the reprint is not likely to diminish the value of any. It is, however, a virtually essential complement, nd it makes this great work now readily accessible for any serious student, performing for American herpetology what Martin Luther did, in reference to the Bible, for the Christian world: making a basic work previously monopolized by the privileged few available to the common man.

Because of the general accessibility of Holbrook's monograph provided by this reprint, herpetologists in general--not only the "privileged few"--can appreciate the extraordinary degree to which Holbrook was ahead of his time. Had the work been widely available it might have had a very salutary effect upon herpetological practices of the latter half of the 19th century, because in Holbrook's time, and before, descriptive herpetology was for the most part extremely superficial, and it remained so until near the turn of the century. Holbrook's work, on the contrary, was far superior, providing detail that was not widely recognized as essential until well into the 20th century. Had his monograph been widely accessible and readily consulted, his meticulous work might have been more widely influential. His care in nomenclatural usage was also exceptionally exemplary for his time. The conclusion cannot be escaped that in herpetology he was an intellectual giant in his era, certainly not approached by any other American worker. Rather like Leonardo da Vinci, unfortunately, the full extent of his genius was not widely appreciated for many years, and indeed never would have been so without the appearance of this popular, annotated edition of his greatest work.

So dedicated have been the efforts of so many individuals to make this reprint perhaps the most notable publication event in herpetology of this century, that it is very difficult to envision any way in which it could have been improved. It approaches very near absolute editorial perfection. In matters of style, it might have been preferred that the nomenclatural rule had been followed of enclosure of an author's name in parentheses after the name of species using a generic name other than the original; or that the policy adopted in the International Code of Zoological Nomenclature, of hyphenation of all combinations of "type" (e.g. type-locality, type-specimen, etc.) had been followed. These are essentially subjective and quite insignificant reservations.

In sober consideration of the significance of this event, it is apparent that the superficially



formidable price of $60 is in reality an exceptional bargain and it behooves any serious student of North American herpetology to take advantage of it while he can. Every herpetological library of institutional caliber anywhere in the world would benefit by possession of a copy.

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ONTOGENY AND PHYLOGENY by Stephen J. Gould. 1977. The Belknap Press of Harvard University Press, Cambridge, Massachusetts. ix + 501 pp., illus. $18.50.

Every year when I ask my freshman zoology class, "Who has heard the phrase 'Ontogeny recapitulates Phylogeny'?" most students raise a hand. I then ask whether their high school biology teachers presented this slogan as "true" or "false." About as many students indicate "true" as "false." This interrogation leads into a class discussion of Haeckel's famous principle. The class comes to believe that there may be some vague truth to the Haeckelian declaration but that it doesn't stand up as an invariant law of evolution. The students may learn something from this exercise but I come away each year feeling like something is lacking (besides quality education in high school).

Things should be better this year thanks to Steve Gould's new book Ontogeny and Phylogeny. Gould reviews, clarifies and interrelates such important concepts as recapitulation, heterochrony, paedomorphosis and neoteny.

Ontogeny and Phylogeny is really two books. The first one of approximately 200 pages reviews the history of the recapitulation concept from before Aristotle to the beginning of this century. The second book, of equal length, starts with an examination (and a rejection) of de Beer's (1940) classification of the products of heterochrony. The body of the second book is a presentation of Gould's own ecological perspective on heterochrony. The last chapter affirms the role of neoteny in the evolution of man.

The remaining pages consist of chapter by chapter footnotes (26 pages worth), a bibliography (circa 850 references!), a topical glossary of some hundred terms pertaining to ontogeny and phylogeny, and an index.

The book is far more than the above summary or book title indicates. Gould documents, in his own words (p. 6) "the decisive influence that recapitulation has had on non-biological areas as disparate as racism and Freudian analysis" in order to "convince some scientists (an unnamed sociobiologist comes to mind) that the arcane researches of cloistered academics may be full of social significance, and that scientific detachment and absolute objectivity are myths." Gould makes no effort to be subtle in his condemnation of biological determinism.

In the latter half of the book. Gould makes several important biological distinctions. Heterochrony (acceleration or retardation of the development of one organ system in relation to another) produces parallels between ontogeny and phylogeny. Depending on what is retarded and what is accelerated the morphological result may be recapitulation, or paedomorphosis. Both progenesis (=De Beer's "paedogenesis"--Gould prefers progenesis for historical reasons) and neoteny come under the heading of "paedomorphosis." In the former case, the growth of somatic features is retarded, while in the latter case, the maturation of reproductive organs is accelerated. Gould shows that this is no trivial difference. Using pages of examples, Gould demonstrates that progenesis is regularly associated with miniaturization, short generation times and rapid rates of population growth (r-selection in the parlance of population biology). Neoteny, in contrast, is usually associated with adaptations for maintenance of individuals near environmental carrying capacity (K-selection). The slow development

of neotenous individuals is just such a K-selected adaptation. Although Stearns (1976) cautions us against the casual application of r-K selection, Gould builds an extremely well documented case. His insight into the importance of heterochrony on life history strategies is, to me, the most valuable part of this book. Finally someone has provided a consistent and ecologically meaningful distinction between paedogenesis and neoteny.

In a short concise epilogue Gould links his whole story to that of regulatory genetics. Heterochrony can account for enormous morphological differences between ancestor and descendent by slight differences in the expression of a few regulator genes. Rapid morphological evolution with a miniscule modification of the genome--this, Gould believes, is the "major stuff of evolutionary change" (p. 409).

By now you may have decided that this ambitious book has little to do with the refined discipline of herpetology. On the contrary, amphibians receive extensive coverage in Ontogeny and Phylogeny. The axolotl initially rose to fame when presented as evidence against recapitulation. Gould argues that something so atavistic as this adult Ambystoma with gills nevertheless failed to sway 19th century proponents of recapitulation; along the way he reviews much of the early literature on artificial metamorphosis of salamanders. Perennibranchiate salamanders are presented as ideal examples of K-selected neotenic animals. The works of Sprules (1974a,b) on Ambystoma and Wake (1966) on plethodontids are discussed in detail. Although Gould is not a herpetologist he has established strong communications with herpetologists. His terminology makes good herpetological sense and is likely to be used by workers in our field.

My major regret about this book is that it is longer than it need be. It is repetitive, with hundreds of conversational asides that break up the flow. I fould myself becoming frustrated by the constant need to flip to the back of the book to track down notes. Many of the notes are not essential and only appear because the language of some German author appealed to Gould's poetic sense.

The same erudition and witty verbal constructions that make Gould's column ("This View of Life") in Natural History a delight to read begin to appear self-indulgent when unconfined by space limitations. Gould loves to turn a phrase. His new perspectives may reveal delicate features of a subject and give it depth, but they can obscure the overall view.

This is a book too important to be buried in libraries under its own weight. Hopefully a shorter version will appear. While this suggestion may offend the purists, I do not believe that the shorter versions of the works by Ernst Mayr, G.G. Simpson and D'Arcy Thompson, for example, hurt their causes. Gould's contributions to the fields of functional morphology and evolutionary biology rank with the contributions of Thompson, Mayr and Simpson to their respective fields. His work deserves equal exposure.

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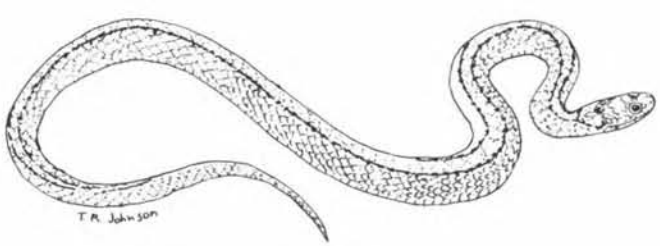
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Herpetological Husbandry

The Captive Care of Hatchling Tortoises

In general, the captive rearing of newborn reptiles is difficult and often exasperating. More specifically, hatchling tortoises often present the herpetologist, whether amateur or professional, with husbandry problems that must be solved in order to insure the survival of these chelonians.

One can group certain problems imposed by captivity as follows: 1) improper cage substrate; 2) constipation; 3) eye disorders; 4) temperature regulation.

For seven years, twenty-three hatchling tortoises belonging to the genus Gopherus, and several specimens of Geochelone chilensis have been successfully grown to the adolescent stage with no hatchling mortality. The step-by-step procedure and the solutions to the above listed problems, which lead to instant success, are here presented.

Cage Substrate: It has been found that all inorganic substrates are undesirable and usually lead to 100% hatchling mortality within 18 months. Death is caused by intestinal impaction, and can be diagnosed by a tortoise that is heavy but not feeding for a prolonged period.

Solution: A plant fiber substrate known as "Litter Green" can be purchased at any grocery store and will provide the ideal cage flooring. if the small pellets are ingested they are easily digested with no resulting impaction. One inch of litter is sufficient to create good traction and absorption of fluids.

Constipation: The most common cause of death in newborn terrestrial chelonians, in captivity, is constipation. This can be caused by ingestion of sand or gravel cage substrates or by improper diet.

Solution: Prepare a pan of lukewarm water that will allow the tortoises to get air without difficulty. Place the hatchlings individually in the bath for soaking and drinking. This procedure should be followed every week during their first year, whether or not constipation is suspected. Soaking tortoises is one of the most useful procedures to prevent beginning constipation problems and of course for metabolic needs. Immediately after a hatchling drinks for a few minutes, it will have a bowel movement composed mainly of uric acid. This flushing out of its system works very nicely, and keeps the eyes free of particles.

Eye Disorders: Swollen eyes and loose skin around the eyes may be the result of inadequate diet--the lack of vitamin A.

Solution: The following diet should be used for all desert or Mediterranean species: 40% leafy romaine lettuce; 40% raw spinach leaves; 5% chopped apple; 5% grated carrot or tomato, with tricalciumphosphate mixed in for vitamin-mineral supplementation. The salad can be sprayed, lightly, with water to allow the tricalciumphosphate to adhere to the leafy material. This provides a good reliable diet, which is readily accepted by the tortoises. The hatchlings should be fed daily as much as they can consume.

Temperature Regulation: The whole key to any reptile's survival is proper environment. Many reptiles fare better if exposed to a mild temperature drop from day to night. These types of tortoises fall into this group, so the keeper will want to satisfy this important requirement.

Solution: A group of tortoises, up to ten hatchlings, can be best housed in a ten gallon size glass aquarium. The tank should be equipped with a clamp-on light socket and a 60 watt bulb. This should be mounted at one end of the cage, so that the youngsters can move away from the heat source if need be. This cage set-up must be in a building or room that is maintained between 70-75 F during the day; the bulb should be set so that it is 5-6" above the organic substrate. The daily temperature drop is accomplished merely by turning off the light for the evening. The lamp is then turned back on in the morning. An inexpensive 24 hour automatic timer can be installed for the more absent-minded keeper. No top is needed over the tank, unless the room is maintained below 70 F during the day. The temperature should not drop lower than 60 F at night and the daily variation should not exceed a range of 25 F.

Tortoises of the genus Gopherus have grown to a length of 4-5" (carapace straight line measurement) during the first year following this type of husbandry procedure. Specimens exhibiting pyramidal shape of the dorsal laminae do so because of excessive growth.

One may wonder why inorganic substrates should be avoided, when these animals live in the wild on sand, dirt, and gravel-like areas. All too often, people believe that they are duplicating a natural situation in captivity, when, in fact, the effort is very unnatural and detrimental to the captive. Tortoises feeding in the wild are not exposed to food items that are dropped on the ground while still moist as in captivity, nor are they ingesting large quantities of debris with their daily feedings. When a person placed a hatchling tortoise on sand, this substrate sticks to the food and is consumed during feeding; this eventually causes the death of the chelonians.

In summary, a keeper will find that a ten gallon aquarium filled with plant fiber litter and heated by a 60 watt light bulb will easily keep a herd of hatchlings thriving after their weekly "swim" and soak sessions.

Products mentioned in the article: LITTER GREEN, 100% alfalfa pellets, manufactured by McFadden Company, 6901 West 63rd Street, Overland Park, Kansas 66202.

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Some Aspects of Breeding and Raising Aquatic Chelonians: Part I

In the past two decades, there have been several noteworthy publications on chelonians (Wermuth and Mertens, 1961; Pritchard, 1967, Ernst and Barbour, 1972; Conant, 1975), but most have been primarily concerned with identification and range. Although most give some information on reproduction and basic captive care, reference to breeding and rearing turtles in captivity is lacking. Reichenbach-Klinke and Elkan (1965), Wallach (1969, 1970, 1971), Dobbs (1973), Frye (1973, 1976), Murphy (1975) and others gave information on diseases and treatments in reptiles including turtles, and Murphy (1973) summarized published accounts of ailments in captive chelonians with some reference to care in captivity. Many scattered references can be found in various journals, each concerned with one or more aspects of turtle care and reproduction. However, there has been no attempt to outline the parameters necessary for successful reproduction and raising freshwater aquatic turtles in captivity, other than some early references to reproduction for economic reasons (Hildebrand, 1929).

Recently, Tryon and Hulsey (1977) described care and reproduction of captive bog turtles, Clemmys muhlenbergi, at the Fort Worth Zoo. Although this paper was concerned with only one species, many of the techniques described have been successfully used, in part, for other species of aquatic and semi-aquatic chelonians in the zoo. The present paper is a summarization of the techniques of care and maintenance that in recent years has contributed to successful chelonian reproduction, and the raising of hatchlings.

I wish to thank the staff of the Department of Herpetology, Fort Worth Zoological Park, especially David B. Heckard, J.P. Jones, and John E. Simmons for their help and encouragement during the preparation of this paper. Joel D. Wood is solely responsible for the development and success of the gelatin diet described herein. Special thanks go to Terry G. Hulsey, who spent endless hours developing many of the techniques presently in use at the zoo.

Several literature references are available on observations made either wholly or in part on turtles maintained at the zoo (Mehrtens, 1966, 1967, 1973; Campbell, 1972), and most of the individual animals received in the mid to late 1960's are presently thriving. Acclimation to captivity varies considerably; however, it has only been in recent years that most of the successful reproduction has taken place. Peaker (1969) stated that merely because captive reptiles seem to be thriving does not mean they will reproduce. Anyone with experience in keeping captive reptiles knows this to be true, and it applies to all reptile groups. Copulation may be observed on a regular basis, but no eggs or young result from these matings. Certain modifications of lighting, diet, temperature, and general care have led to the egg-laying and subsequent hatching of ten taxa of turtles in the years 1973 through early 1977, most in consecutive years. These include Reeves turtle, Chinemys reevesi, Texas slider, Chrysemys concinna texana, red-eared slider, Chrysemys scripta elegans, bog turtle, Clemmys muhlenbergi ,three-striped box turtle, Cuora trifasciata, crowned hill turtle, Geoemyda trijuga coronata, Ceylon hill turtle, Kinosternon leucostoma, giant mud turtle, Staurotypus triporcatus, and the Stinkpot, Sternotherus odoratus. Much of the egg-laying occurs in winter and spring, and as of 1 August 1977, hatchlings from several species were produced.

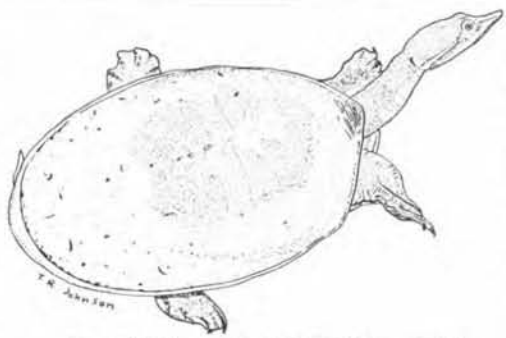


Geoemyda trijuga thermalis (Ceylon Hill Turtle) hatches after 120 days incubation.

ADULT MAINTENANCE

Most of the adult turtles are housed in four major exhibits according to geographical range. Pools vary from 500 to approximately 7000 liters, and dry areas for basking, resting and nesting are provided. Rock facades, waterfalls, and the use of live plants varies with each exhibit to give a naturalistic and pleasing effect for the public and perhaps the animals therein. Several of these are mixed exhibits containing crocodilians. For example, in the African hall, the "Congo River" scene contains a 2000 liter pool and houses two male and two female West African dwarf crocodiles, Osteolaemus tetraspis and several turtles of the genera Pelomedusa and Pelusios. The South American hall contains the 7000 liter "Amazon River" exhibit housing three male and two female Yacare caiman, Caiman crocodilus yacare and turtles of the genera Chelydra, Chrysemys, Dermatemys, Kinosternon, Phrynops, Podocnemis and Staurotypus. The majority of reproduction in 1976 occurred in the 4000 liter Australia-Asia turtle exhibit which houses Chelodina, Chinemys, Clemmys, Cuora and Geoemyda. Although each exhibit varies according to pool size, available land area, and the number and size of species, each has certain similarities which I feel are responsible for successful reproduction.

Artificial lighting is provided between 0800 h and 1730 h daily by Vita-lite fluorescent tubes (Durotest Co.), suntubes (Westinghouse FS 40, T 12), and spotlights of various sizes. Turtles exposed to insufficient ultra-violet radiation cannot synthesize certain essential vitamins (D2, D3) which help absorb calcium (Pritchard and Greenhood, 1968; Wallach, 1971; Moll and Legler, 1971). Deformed shells as well as other bony structures, and eggs with improperly formed shells may be signs of inadequate lighting. In 1972, each of our enclosures was supplied with one to eighteen 40 watt (four foot) Vita-lite fluorescent tubes, depending on exhibit size. Not only do these produce a natural "daylight" type lighting, but Vita-lite provides approximately ninety-one percent of the natural ultra-violet radiation (Laszlo, 1969). One or more 40 watt tubes are supplied for basic lighting at the front of each exhibit 1 m to 1.5 m from the basking areas. Additional double four-foot fluorescent fixtures are added as necessary 1.5 m to 2.5 m above the exhibit floor or pool surface. The importance of Vita-lite cannot be underestimated, and in addition to the animals, most indoor plants will thrive with its use in an exhibit.



In addition to Vita-lite, some exhibits utilize one or two 40 watt suntubes at a distance of 2 m to 2.5 m above the turtles. Although these can be used interchangeably with Vita-lite tubes in fluorescent fixtures, it is recommended that these be placed no closer than 1.5 m above the animals or possible ultra-violet overdose may result. If suntubes must be installed closer, the duration shall be approximately half of the 0800 h to 1730 h cycle. I have seen appetites in both turtles and lizards increase after exposure to suntubes 1-2 h daily. It also seems apparent that ultra-violet radiation destroys certain harmful bacteria and fungus. Any aquatic situation can be a haven for such, especially when animals and their food items are invovled, and if left unchecked, disease can quickly wipe out an entire turtle collection. Although chelonian disease is beyond the scope of this paper, I feel that the use of proper artificial lighting has helped to successfully prevent outbreaks of pathogenic problems in the zoo's collection. Finally, a reduction of certain unpleasant odors originating in the cage occurs after the installment of suntubes. I feel this to be a direct result of reduced bacterial growth.

One or more strategically placed 250 watt spotlights give turtles a chance to bask and thermoregulate in certain parts of the enclosure. Murphy (1969, 1972) described these conditions as "hot spots" creating thermal gradients. In general, the greatest amount of heat is usually in these areas, and an animal utilizing the "hot spots" has an opportunity to dry out and possibly metabolize more thoroughly. A less variable enclosure temperature can be established through the use of 25 watt floodlights. These are used only infrequently in smaller enclosures, however, for it is felt that a range of temperatures should be available at most times. In addition, flood lights tend to eliminate the darker areas which most reptiles, including the turtles, need and utilize to a greater or lesser degree as places of refuge.

Most enclosures receive a certain amount of natural sunlight through clear skylights above each herpetarium section. Daybreak and total darkness generally extend the 0800 h to 1730 h period of artificial lighting. I feel that seasonal fluctuations in photoperiod are important for proper reproductive cycling in most temperature and subtropical species. What degree of importance photoperiod plays and how it relates to temperature fluctuations, rainy vs. dry seasons, etc., has yet to be determined for the majority of reptiles. It most probably varies somewhat from species to species found in the same general locality. Fitch (1970) stated that some reptiles reproduce regularly at the same season of the year regardless of captive conditions. While this may be true for some, it is definitely not true for most species, and it is perhaps best to attempt to duplicate the natural environment of each animal or animal group as accurately as possible. For most, this would indicate daily and seasonal fluctuations in photoperiod and temperature.

Most reptile buildings historically have been by far the warmest of all zoo facilities. Whether this resulted from assumptions or misinformation is not clear, but it probably continued as a form of tradition. Few early references were available on thermal requirements of reptiles, and all too often it was thought that, for example, since a species was tropical, and all tropical regions are "hot", then that species must be constantly maintained in the warmest possible atmosphere. Little thought was given to conditions within the particular habitat. There is a considerable temperature variation from one life zone to another, whether it be tropics or elsewhere, and this must be taken into account not only for proper maintenance but for reproduction in captivity.

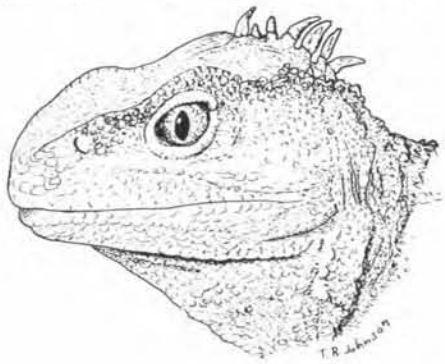
Most chelonians spend a certain percentage of their time basking in full sunlight. At such times, body temperatures may be optimum (preferred), and basking turtles will usually remain so until a voluntary maximum temperature is attained, at which time they will retreat into the cooler water or some shady area. Thermoregulation is apparently extremely important for all chelonians (Moll and Legler, 1971; Brattstrom and Collins, 1972), and there is evidence that they thermoregulate underwater at various depths and at low ambient temperatures (Brattstrom, 1965; Gibbons, 1967). Tortoises of several species have been observed periodically within a small rectangle of natural sunlight provided through skylights after they were moved indoors for the winter. Brattstrom (1965) recorded body temperatures of a number of turtles that ranged from 8 C to 37.8 C with a mean of 28.4 C, and concluded that thermal tolerance may differ accord-

ing to taxa. In addition, although reptiles with low thermal tolerances are active in colder areas, tropical forms did not have higher thermal preferences than temperate species. Tropical species, however, cannot tolerate conditions of cool or cold temperatures.

Though captive chelonians must be kept within certain temperature limits for successful maintenance, these limits may not necessarily be suitable for reproduction. Murphy (1973) suggested a daily range of 26.6 C to 32.2 C for most turtles, and that some reptiles can adjust to lower available temperatures. Licht (1965) and Licht and Basu (1967) concluded that spermatic destruction can occur if a constant optimum body temperature is maintained, and that photoperiod and temperature are closely related for certain reptiles. Herein lies the fallacy that continuous optimal heat must be supplied to captive reptiles. The Fort Worth Zoo has been successful in reproducing 52 total species and varieties of reptiles since 1971, and it is believed that lowered and fluctuating temperatures were a major factor.

Approximate temperature varies from 35 C in the areas of the "hot spots" to 22 C in shaded areas of the turtle exhibits in summer, and from 30 C to 20 C respectively in the winter. Quite naturally, basking is limited to shorter periods of time during the warmer months, and in the winter may continue throughout the eight hour period of artificial lighting. Tempered water at an average temperature of 25 C is used during weekly or semi-weekly exhibit cleaning. Each exhibit is provided with an overflow and a continuous supply of tempered water is available. Turtles reaching their preferred maximum body temperature while basking can utilize the water and will not be subjected to thermal shock due to cold winter water supply.

Cleanliness of chelonian facilities cannot be underestimated. Each exhibit is drained, thoroughly cleaned and refilled at least once each week, usually the day after the heaviest feeding. Most frequent water changing is undesirable because of the stress on individual turtles and because of the relative high chlorine content found in most metropolitan water supplies. Murphy (1973) stated that some hatchling turtles keep their eyes closed when subjected to fresh tap water. I have seen this to be true also for adult turtles, and certain aquatic salamanders (Amphiuma, Andrias) and anurans show a marked dislike for fresh tap water regardless of temperature. Frequent cleaning can be avoided by various types of filters which will keep water quality at a high level. Large (2000 to 7000 liter) exhibits are serviced by filters available for swimming pools. Smaller enclosures are serviced by diatomaceous earth, power, or airline filters of appropriate size. Ideally, a standard aquarium power filter is suitable for a 38 to 76 liter aquatic facility depending on the number of individuals, and filter size should be directly proportional to the increase in water volume. At no time however, should filtration preclude proper cleaning.



OFF-EXHIBIT FACILITIES

To a greater or lesser degree, most zoo reptile buildings contain off-exhibit facilities. Aside from obviously having more animals than exhibit space permits, certain factors necessitate housing animals in these enclosures. These may be for 1--newly received specimens which are isolated until they are considered free of contagious disease, 2--separation of individuals at certain times of the year for reproductive reasons, 3--animals developing signs of illness, and 4--certain shy individuals or species that are considered valuble to the collection yet do not acclimate to exhibit conditions.

Recently acquired specimens should be subjected to a period of strict quarantine. This may be several weeks to several months, depending upon the species and its history prior to accession. Murphy (1973) suggested soaking all incoming turtles in a broad spectrum antibiotic such as tetracycline hydrochloride (Polyotic). This can be mixed directly with tempered water in a ratio of one teaspoon to one liter of water, or until a light orange color is achieved in solution. The animal can then be placed in it, usually for a period of 24 hours. Once the specimen is established in a temporary enclosure, careful observation of feeding and general behavior is essential. One sure sign of health is the appearance of the feces. Most experienced persons can judge the health of their animals by a quick glance at fresh feces. Loose, mucoid, discolored, or bloody stools are usually signs of some problem (see Murphy, 1975). More than one collection has lost numerous specimens through the simple addition of one un-quarantined turtle to a mixed exhibit.

Certain shy species or those that cannot compete in a mixed exhibit are placed in off-exhibit enclosures. These include aquaria of various sizes, galvanized metal stock tanks, and specially constructed, waterproofed, wooden boxes. Although not on exhibit, these turtles are maintained under the same conditions of temperature and lighting available for exhibit enclosures. Tryon and Hulsey (1977) described off-exhibit housing for adult Clemmys muhlenbergi. This was apparently adequate for this species' well-being, and eggs and hatchlings were produced in two consecutive years. One advantage of these enclosures is that they can be easily moved outdoors during the warm months. Natural sunlight is far superior to any artificial lighting arrangement, and an even greater seasonal temperature fluctuation may be available. Possibly, any small to medium sized adult chelonians (100-200 mm carapace length) can be successfully maintained and reproduced in relatively simple enclosures if areas for basking, hiding, and nesting are provided.

A typical off-exhibit enclosure consists of a rectangular wooden box with average dimensions of 130 x 75 x 36 cm. Silicone aquarium sealer is used to prevent leakage, and then a neutral colored, non-toxic, waterproof paint is applied to the inner and outer surfaces. A waterproof plastic pan is placed in one corner of the box, encompassing approximately one-fourth of the total area. Rocks are placed around the pan at the water level to provide wet, dry, or intermediate areas of thermoregulation and easy access to the pan. The pan is filled with 2.5 cm of pea gravel for drainage and covered with 5.0 to 10.0 cm damp sphagnum moss. This provides an area for seclusion and nesting.

Indoors, each enclosure is provided with one or two 40 watt Vitaline tubes from 2-4 m distant that are on from 0800 h to 1730 h daily. In addition, a 250 watt spotlight is suspended 1 m above the sphagnum filled pan to provide a thermal gradient. Temperatures directly under the spotlight during the cool months average 30 C at midday. Temperatures under the layer of sphagnum average 23 C, and water temperature averages 23 C.

In April or May of each year these facilities are moved outdoors and placed in an area where partial shade is available during the warmest hours of the day. Each is covered with a secure lid of 38 mm mesh to prevent predation from cats, raccoons, and zoo visitors that may

wander into the area, yet provides for the passage of full sunlight. During the warmest months, a board is placed longitudinally which covers half of the enclosure, providing areas of both sunlight and shade. Logs, corkbark or boards are added occasionally to provide additional basking areas, depending on the number of turtles housed. In mid-September or early October, or when the temperature begins to attain lows of 8 C to 10 C for temperature species and 16 C to 18 C for tropical forms, the enclosures are moved indoors. Care must be taken to assure that water temperature remains somewhat below 30 C on the warmest days.

Experience seems to be the only test for variations of compatibility. Certain species require housing on a one to one sex ratio and isolation from other forms, while others will thrive in mixed situations (such as exhibits) housing not only others of the same sex and species but other genera. In my experience, Clemmys muhlenbergi should be maintained in a ratio of one male to one to several females. Although males may be switched from one enclosure to another, placing two males together may result in continuous fighting, often resulting in intimidation, injury, or death. If separated, all male specimens may be reproductively active, but if not, the subdominant individuals may never have a chance to breed and their health may suffer. Conversely, Clemmys guttata may successfully be maintained in situations housing more than one male. Other examples include Graptemys versa, where females will periodically attack the smaller, sexually dimorphic males during non-reproductive seasons, and two Fly River turtles, Carretochelys insculpta, although totally compatible with other species, that would fight savagely whenever placed together. Intraspecific and interspecific differences vary considerably and must be judged accordingly.

DIET AND FEEDING

Adequate nutrition plays a major role in successful chelonian reproduction. Most major works on turtles (Pritchard, 1967; Ernst and Barbour, 1972, and others) that include aspects of captive care treat feeding lightly. It can be generally concuded, however, that there are two major types that can be grouped according to feeding strategies. These are the tortoises, that are mainly herbivorous, and the aquatic forms, which are largely carnivorous, or omnivorous to a degree. Inadequate nutrition can not only prevent reproductive cycling, but can lead to a multitude of physical problems (Murphy, 1973; Frye, 1976). Edgren (1960) stated that calcium loss and a decrease in bone density occurs in female Sternotherus odoratus at the time of egg-laying, and this must be compensated for through proper nutrition. Conversely, a properly fed turtle may not develop disease even if exposed. It is no wonder that turtles maintained on the dried insect diets sold in pet stores, or on hamburger meat and lettuce, inevitably develop nutritional deficiencies and other maladies.

Composition of Foods (Watt and Merrill, 1963) gives insight into the variety of nutrients contained in food items. A continuous diet restricted to one or two food items is inadequate. For example, two common foods used by many private turtle fanciers are raw hamburger meat and lettuce. Raw hamburger (regular ground), while containing 268 calories per 100 g portion, provides only 17.9 g protein, 21.2 g fat and no carbohydrates. In addition, important vitamins are present only in traces if at all (40 I.U. Vit. A, .08 mg Thiamine, .16 mg Riboflavin, 0.0 mg Vit. C). Raw lettuce of any type is even worse. It is approximately 95 percent water, and 100 g provides 13 to 18 calories, 0.7 to 1.3 g protein, and the same traces of vitamins as does the hamburger with the exception of vitamin A (330 to 1,900 I.U.) and vitamin C (6 to 18 mg).

The exact daily nutritional requirements for aquatic turtles have not been determined, but the key consideration for any turtle diet is a broad variety of different food types (see Folkerts, 1968; Punzo, 1974). Adult chelonians at the zoo are fed two or three times per week, and food items vary with each feeding. Most aquatic and semi-aquatic turtles prefer to ingest their meals underwater. They will, however, feed on land where water is unavailable, or when competititon is too great under the surface. Some will frequently grasp the largest available piece of food and rapidly carry it up onto the land area where it can be slowly consumed. Any combination of spaced feeding days is acceptable, but adherence to a schedule is most important. Periodic fasting will not hurt turtles in good condition, and they may voluntarily fast during the coolest and warmest months. Hutton (1960) indicated that metabolism may be internally controlled and independent of all but gross changes in temperature. If appetites diminish, it is always best to feed the food items of highest nutritional value. When appetites are at their peak, so should be the variety of food items offered. The first day of the three day schedule includes a salad type mixture of diced apples, oranges, carrots, onions, lettuce, bananas, Bird of Prey Diet (ZuPreem Co.), Marmoset Diet (ZuPreem Co.), and mealworms. Combinations vary seasonally, and periodically tomatoes, squash and even hard boiled eggs are offered. The salad can be placed in the water, but it is better to leave the tray at the pool's edge thereby assuring that separation of the different items will not occur. Two days later, feeding may utilize some whole animal or animal parts, such as skinned mice. Using the entire animal permits ingestion of internal organs, and these contain the majority of essential nutrients. The mice are skinned to prevent ingestion of a large bulk of non-nutritive hair and skin, to prevent amounts of the undigested hair in feces that may foul the water and clog the filters, and simply to make feeding easier for the turtles. If animal parts are used, it is preferable to feed both entrails and muscle tissue. Turtles will relish hairless, newborn mice, and these are used periodically; however, they lack complete development of certain internal structures, such as the skeletal system, and this may result in a deficiency if fed too frequently. Feeding on the third day consists of a specially made supplemental food called "turtle gelatin". This method was first described as a diet for aquarium fish (Peterson, et al., 1968), but was later used in various forms as food for chelonians at the Philadelphia Zoo (Conant, 1971) and the Fort Worth Zoo. This highly successful food was developed through much trial and error, and has proven to be the best method of supplying turtles with the greatest possible degree of nutritive value and variation in the least amount of food ingested. Since it is highly concentrated, feeding should be restricted to once per week for most turtles. It can be fed more frequently to sickly or starved individuals. Turtle gelatin is made as follows:

1) Line a large chafing dish with 40 g Bird of Prey Diet and 200 g Marmoset Diet (ZuPreem). Over this sprinkle a mixture of:
   - 1/2 cup ground shrimp meal
   - 1/4 cup ground bone meal
   - 3 200 I.U. caps of vitamin E
2) In an electric blender, mix:
   - 1 cup gelatin (Knox unflavored)
   - 2 cups steaming hot water
   - 1/2 cup fresh, thawed spinach
   - 1 1/2 cups chopped carrots
   - 1 jar baby food spinach
   - 1/4 cup mealworms
3) When thoroughly mixed, pour this over the contents in the chafing dish.

The entire dish should then be placed in a freezer until gelled but not frozen. At this time it can be cut into cubes of various sizes. One cube 2.5 cm to 5.0 cm is adequate for any small to medium sized turtle. Since the cubes are gelled,

they can be thrown directly into the pools and will dissolve very slowly, thereby assuring that most will be consumed. Unused gelatin cubes can be stored for up to a week at normal refrigeration temperatures or frozen for extended periods. Obviously, any combination of fruits, vegetables, baby foods and insects can be used. Chopped liver, raw beef, or skinned, chopped mice can be substituted for the prepared ZuPreem products. It is important, however, that the ground meals and vitamins be used with each preparation. It must be remembered that this is a supplement and should be used in conjunction with a varied diet containing other meats, vegetables, and insects. When this supplement was first used, several turtles that had not increased in size appreciably in years showed new growth.

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FATAL TOAD POISONING IN SNAKES

The toxic nature of the secretion from the paratoid and other dermal glands of toads (genus Bufo) is well known. Jensen and Westphal (1956) note that it contains cardiotonic and hypertensive elements and is highly toxic to cats and dogs.

Many species of snakes display a tolerance to toad venom and include these amphibians in their diets. Conversely, other snake species, including some frog-eaters, shun toads as food. Licht and Low (1968) found that toad-eating Thamnophis sirtalis tolerated force-fed dosages of toad venom that killed similarly dosed individuals of several species of Masticophis and Salvadora, snakes that do not eat toads.

Tschambers (1948) reports the case of a snake, Dinodon semicarinatum, feeding regularly on frogs but dying shortly after ingesting a toad, Bufo americanus. The following two similar incidents occurred more recently at the Baltimore Zoo.

Ten Madagascan tree boas, Sanzinia madagascariensis, born on 18 August 1971, all fed mainly on newborn mice and hamsters but one also would accept small frogs and salamanders of various species. The latter snake devoured a small toad, Bufo woodhousei fowleri, on 30 January 1972 and thereafter was unobserved until found dead the next morning.

Ten Madagascan hognosed snakes, Lioheterodon madagascariensis, that hatched on 24 June 1976 fed on several types of frogs and salamanders. One snake was offered a small Bufo w. fowleri on 8 July 1976. This snake held the toad in its mouth for about five seconds, released it, then began to writhe violently and died within five minutes. Post mortems performed on our two snakes showed no signs of disease or other significant pathology

but did not exclude the possibility of toad poisoning.

It is noteworthy that all three of the above snakes were from toad-free areas. Sanzinia and Liopheterodon are endemic to Madagascar, where toads have never occurred (Savage, 1973). The Dinodon was from an unknown locality in the Ryukyu Islands, where one toad, Bufo bufo gargarizans, occurs only on Miyako and may have been introduced there recently (Inger, 1947). Although Dinodon semicarinatum is recorded from several of the Ryukyus, it is not known, as far as we can discover, from Miyako.

Susceptibility to toad venom well may be the ancestral state of snakes in general. Some species may have added toads to their diets as a result of competition for food and, probably through natural selection, became resistant to the venom. Obviously, snakes occurring in toad-free regions would not develop such resistance.

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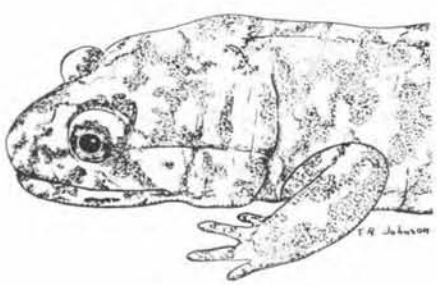
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FRANK GROVES, Reptile Department, Baltimore Zoo, Baltimore, Maryland 21217; and JOHN D. GROVES, Reptile Department, Philadelphia Zoological Garden, Philadelphia, Pennsylvania 19104. ●



Legislative Alert

Legislation and Rulemaking Re: Herps

In accordance with the idea of keeping our constituency informed of U.S. Federal legislative activities involving reptiles and amphibians, the following is a brief review of the 1977 wildlife regulations affecting "herps":

In May, 1977 published regulations (F.R. Vol. 42, No. 35 - Tuesday, February 22, 1977) became effective relative to enforcement of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The U.S. and nearly 40 other nations are party to the Convention which has established procedures to control and monitor the import and export of species covered by the treaty.

The Convention and Endangered Species Act (87 Stat. 884, 16 U.s.C. 1531-43) of 1973 share many similarities in that the protection they provide extends to species worldwide; however, it is important to point out that these separate measures - one domestic and the other international - employ different terminology, address separate (but overlapping in some instances) lists of protected species, and, in addition, serve somewhat different purposes.

The primary function of the Convention is to regulate international trade in the species it protects. Its rules apply only to import, export, and re-export. The rules do not apply, as part of the international document, to interstate shipments, to the "taking" (killing or capture) of species, or to the preservation of habitat. The Convention approaches the protection of species from the standpoint of how trace (import-export) would affect the status of a particular species in the wild in its native country. The scope of the Convention extends to animals and plants, terrestrial or aquatic. Accordingly, the Convention recognizes that controls are essential now for many imperiled species, and that safeguards are necessary for others that could be jeopardized by a high demand in import-export markets (e.g., reptile skins). The Convention established three appendices, or categories, of species in order to provide for appropriate and differing degrees of control:

--Appendix I: Species that are threatened with extinction and are or may be affected by trade. These species are in need of particularly strict regulation to prevent their future endangerment.

--Appendix II: species that, although not now necessarily threatened with extinction, may become so unless their trade is regulated and monitored.

--Appendix III: Species may be placed on this Appendix by any individual Convention nation (i.e., a nation party to the treaty) as being subject to conservation regulation within its jurisdiction, to gain the cooperation of other countries in re-inforcing its conservation measures. Any nation may list a species native to its country on this Appendix without approval of the other parties to the Convention.

The U.S. Endangered Species Act is broader than the Convention in its application and applies to all jeopardized species that warrant Federal protection - including those endangered by habitat destruction and many other things, whether or not they are of value in the commercial market. The act regulates the taking and capture of all listed animals (and plants), as well as interstate and foreign commerce in both animals and plants, and provides for land acquisition and financial assistance to States and foreign countries. The act provides protection to any species threatened by any of the following factors: 1) the present or threatened destruction, modification, or curtailment of the species' habitat or range; 2) overutilization for commercial, sporting, scientific, or educational purposes; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or man-made factors affecting the species' continued existence. Two living classifications are provided:

--Endangered: Any species that is in danger of extinction through all or a significant portion of its range.

--Threatened: Any species that is likely to become "Endangered" within the foreseeable future through all or a significant portion of its range.

NOTE: Other U.S., State, local, and foreign laws may also apply to species listed under the Act and/or Convention. It is the responsibility of the individual to learn about and comply with all applicable laws. More specific information on the provisions of these laws, as well as permit applications and list of protected species, may be obtained from the Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, Washington, D.C. 20240 (phone: 202/634-1496).

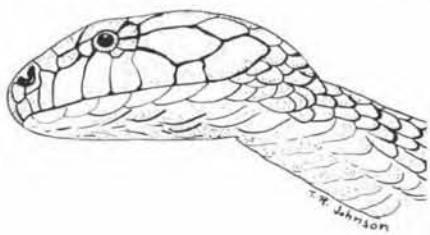
Other legislative notes: In February, 1977 the U.S. Fish and Wildlife Service reclassified the status of the American alligator (Alligator mississipiensis): populations throughout Florida and in coastal areas of South Carolina, Georgia,

Louisiana, and Texas have been reclassified from Endangered to Threatened; populations inhabiting Alabama, Mississippi, North Carolina, Oklahoma, and inland portions of South Carolina, Georgia, Louisiana, and Texas are still classified as Endangered.

In October, 1977 it was announced that the Fish and Wildlife Service and the National Marine Fisheries Service have agreed by memorandum of understanding to divide program responsibilities covering sea turtles listed under the Endangered Species Act of 1973. Henceforth, NMFS will have sole jurisdiction over sea turtles (including parts or products) when they are in a marine environment (in the oceans, seas, bays, estuaries, brackish water areas, and waters adjacent to nesting beaches). FWS will have sole jurisdiction when the turtles (including parts and products) are on land. The Federal Wildlife Permit Office of the FWS will serve as the central clearinghouse for both agencies in the processing of permit applications and certifications affecting sea turtles.

Final note: Many of our colleagues have complained of not receiving adequate notice of Federal legislative actions involving reptiles and amphibians. The SSAR Board SSAR Conservation Committee are currently working to alleviate this problem by establishing a network of communication among the national and regional herp societies that will allow rapid (within 48 hours of receipt in the Herp Review office) dissemination of legislative information. This system should be fully operational in early Spring, '78.

THOMAS J. BERGER, Museum of Natural History, The University of Kansas, Lawrence, Kansas 66045.



New Endangered/Threatened Species

Persons working with Hyla andersonii (Florida populations only) and Eleutherodactylus jasperi are advised that these have been respectively designated Endangered and Threatened. Also, critical habitat for both species has been described. See Federal Register Volume 452, Number 218 (11 November 1977) for details.

Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Conant (1975) or Stebbins (1966). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916. Short manuscripts are acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

Caudata

AMBYSTOMA TALPOIDEUM (Mole Salamander). USA. ARKANSAS: Columbia Co. 11.2 km E Magnolia on Co. Rd. 61. 17 April 1977. S. Winters. Two specimens verified by H.W. Robison and M.A. Nickerson. S. Arkansas Univ. Vert. Coll. uncataloged and Milwaukee Pub. Mus. (MPM 15281). Third record for Arkansas and extends the known range ca. 410 km SW of nearest known localities in Clay County (FMNH 2903) (Parker, 1947, Proc. Ark. Acad. Sci. 2:17) and 367 km from a locality in Crittenden Co. (C.R. Shoop, pers. comm.), northeastern Arkansas.

Submitted by HENRY W. ROBISON and STEPHEN WINTERS, Division of Biological Sciences, Southern Arkansas University, Magnolia, Arkansas 71753.

HEMIDACTYLIUM SCUTATUM (Fourtoed Salamander). USA. MAINE: Hancock Co: Salisbury Cove. 30 April 1958. C.R. Terman. Verified by S.L. Davis. Collection of C.R. Terman. First specimen for county and second for state. First state record from Kennebec Co. (Fowler, 1942, Copei 1942(3): 185-186). 1 km E Bucksport. 8 May 1976. S.L. Davis. Released after identification. Penobscot Co: 1.5 km W Old Town. 29 April 1976. B.N. Burgason. Verified by Richard G. Zweifel. Amer. Mus. Nat. Hist., AMNH 92881. These records confirm this salamander's presence in Eastcentral Maine (Neill, 1963. Cat. Amer. Amph. Ret., 2.1).

Submitted by BARRY N. BURGASON, School of Forest Resources, University of Maine, Orono, Maine 04473 and SHIRLEY L. DAVIS, Gardiner Road, Orono, Maine 04473.

PSEUDOEURYCEA SCANDANS. MEXICO. San Luis Potosi: 27.7 km NE Ciudad del Maiz. 18 July 1976. E.A. Liner, R.M. Johnson and A.H. Chaney. EAL 4216 (2 sp.). First record for the state and extends range of this species approx. 64.4 km airline SW of the previously known range in Tamaulipas (Walker, 1955, Occ. Papers UMMZ, 567: 1-8; Smith and Smith, 1976, Synopsis of the Herpetofauna of Mexico. IV. Source Analysis and Index for Mexican Amphibians, J. Johnson).

Submitted by RICHARD M. JOHNSON, 4170 Lantern Lane, Mobile, Alabama 36609, ERNEST A. LINER, 310 Malibou Blvd., Houma, Louisiana 70360 and ALLEN H. CHANEY, Box 2092, Texas A&I University, Kingsville, Texas 78363.

Salientia

PELOBATES SYRIACUS SYRIACUS (Southwest Asian Spadefoot). IRAN. MAZANDERAN PROVINCE: 14 km W Babol Sar, public beach on Caspian Sea, ca 36 41'N, 52 29'E. 28 May 1975. S.C. Anderson. Iran Nat. Mus. Nat. Hist. (Muze'-ye Melli-ye Tarikh-e Tabi'i), Tehran, MMTT 1130. Easternmost record for species, first record for Mazanderan Province. Extends range eastward along Caspian Coast ca 285 airline km from Bandar-e Pahlavi (37 28'N, 49 27'E), Gilan Province. (Tuck, 1971, Bull. Maryland Herp. Soc., 7: 51. Eiselt and Schmidtler, 1973, Ann. Naturhistor. Mus. Wien, 77: 182-184).

Submitted by STEVEN C. ANDERSON, Raymond/Callison College, University of the Pacific, Stockton, California 95211.

PSEUDACRIS STRECKERI STRECKERI (Strecker's Chorus Frog). USA. KANSAS: Harper Co: 2.0 km W, 0.9 km S Anthony. 30 April 1977. E. Stegal, E.R. Byrne, D. Grow, and P. Gray. Univ. Kansas Mus. Nat. Hist, KU 174370-174371. First record for the state and extends range northward into Kansas. Verifies Collins' prediction and possible natural occurrence in Kansas (Collins, 1974, Amphibians and Reptiles in Kansas, Univ. Kansas Publ., Mus. Nat. Hist.). Calling in association

with Bufo woodhousei woodhousei, Acris crepitans blanchardi, and Rana pipiens.

Submitted by PETER GRAY, Sedgwick Co. Zoological Society, 5555 Zoo Blvd., Wichita, Kansas 67212. ●

RANA MACROCNEMIS PSEUDODALMATINA (Iranian Long-legged Wood Frog). IRAN. MAZANDERAN PROVINCE: Mohamad Reza Shah National Park, 9 km E Park HQ, ca 37 21'N, 56 12'E. 800 m elev. 30 May 1975. S.C. Anderson and R. McCullers. California Acad. Sci., CAS 141169. Easternmost record for species. Extends distribution ca 450 airline km northeastward of Weyser (type locality) to the eastern limits of the Hyrcanian Forest zone in the Kopet Dagh. (Eiselt and Schmidtler, 1973, Ann Naturhistor. Mus. Wien, 77: 215-20. Tuck, 1974, Herp. Rev., 5: 107).

Submitted by STEVEN C. ANDERSON, Raymond/Callison College, University of the Pacific, Stockton, California 95211. ●

TESTUDINES

CHRYSEMYS CONCINNA HEIROGLYPHICA (Slider). USA. TENNESSEE: Marion Co: 2.0 km SSE Haletown, E. Shore Nickajack Lake (Tennessee River). 26 June 1976. J.B. Iverson. Florida St. Mus., Univ. Florida, FSM/UF 36993. Extension of range 93 km NE in the Tennessee River (Mount, 1975, The Reptiles and Amphibians of Alabama, Auburn Univ. Agric. Exp. Station).

Submitted by JOHN B. IVERSON, Florida State Museum, University of Florida, Gainesville, Florida 32611. ●

SAURIA

COLEONYX VARIEGATUS PENINSULARIS (Banded Gecko). MEXICO. BAJA CALIFORNIA SUR: Isla Espiritu Santo. 12 May 1977. R.L. Seib. California Acad. Sci. 143259. A single adult male specimen found active at night at Playa La Bonanza on south end of island. Only previous island record Isla San Jose. Other subspecies on Islas San Marcos, Santa Inez, and Tiburon (Soule and Sloan, 1966, Trans. San Diego Soc. Nat. Hist., 14: 137-156).

Submitted by ROBERT L. SEIB, Department of Geography, University of California, Berkeley, California 94720. ●

EREMIAS ACUTIROSTRIS (Reticulate Desert Fringe-footed Lizard). IRAN. SISTAN PROVINCE: 10 km Sw Rud-e Hirmand, abandoned village SE of road from Zabol to Dust-e Mohammad Khan, ca 31 03'N, 61 38'E, 45 m elev. 28 April 1975. R.G. Tuck, Jr. and S.C. Anderson. Iran Nat. Mus. Nat. Hist. (Muze'-ye Melli-ye Yarikh-e Tabi'i), Tehran, MMTT 937, 940-941, California Acad. Sci, CAS 141099. First record for Iran. Extends distribution ca 240 km westward of westernmost Afghanistan record and ca 360 km northwestward of westernmost Pakistan record (Leviton and Anderson, 1970, Proc. California Acad. Sci., ser. 4, 38: 187. Mertens, 1969, Stuttgarter Beitr. Naturk., 197: 43).

Submitted by STEVEN V. ANDERSON, Raymond/Callison College, University of the Pacific, Stockton, California 95211. ●

SCELOPORUS GRACIOSUS GRACIOSUS (Sagebrush lizard). USA. NORTH DAKOTA: Slope Co: 19.7 km NNE Marmarth, 46.0 km W Amidon. 21 May 1977. G.H. Duckwitz and A.D. Heimerdinger. Verified by D.M. Hoppe. Univ. of Minnesota, Morris herptile collection, UMM 77-007. New county record and extends the published range 141 km S from McKenzie Co, ND (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co.; Wheeler and Wheeler, 1966, The Amphibians and Reptiles of North Dakota, Univ. North Dakota Press). Captured in a disjunct stand of limber pine, Pinus flexilis.

Submitted by DAVID M. HOOPE, Biology Department, University of Minnesota, Morris, Minnesota 56267. ●

SERPENTES

CROTALUS MITCHELLI PYRRHUS (Southwestern Speckled Rattlesnake). MEXICO. BAJA CALIFORNIA NORTE: Isla Piojo. 6 January 1977. R.L. Seib. California Acad. Sci., No. 143168. First record from this island situated in Bahia de los Angeles in the northwestern Gulf of California. Known from Isla Smith, 4 km NWN of Isla Piojo and the adjacent Baja Peninsula. C. mitchelli angelensis is endemic to Isla Angel de la Guarda. First specimen reported from Isla Piojo (Soule and Sloan, 1966, Trans. San Diego Soc. Nat. Hist. 14: 137-157). Numerous nests and dead young seabirds scattered about the island suggest a possible seasonal food source which could enable this tiny island to support a Crotalus population.

Submitted by ROBERT L. SEIB, Department of Geography, University of California, Berkeley, California 94720. ●

CROTALUS VIRIDIS CERBERUS (Arizona Black Rattlesnake). USA. NEW MEXICO. Grant Co: 37.0 km E. and 12.5 km. S. Glenwood. 19 August 1974. K. Mello. Verified by G.A. McVicker, B.L. Mello and J. Duval, NMSU. Private collection of G.A. McVicker. Extends range 78.9 km. SE of nearest recorded locality (pers. comm., W.G. Degenhardt).

Submitted by KIM MELLO, Department of Fishery and Wildlife Sciences, New Mexico State University, Las Cruces, New Mexico 88003. ●

ERYX JAYAKARI (Arabian Sand Boa). IRAN. KHUZESTAN PROVINCE: S of Shush. 18 November 1968. D. Lay and J. Hassinger. Field Mus. Nat. Hist., Chicago, FMNH 171251. 1 km E of Kupal, dunes near Ahvaz-Behbehan road, ca 31 16'N, 49 10'E, 25-50 m elev. 16 April 1975. R. Khazaie and S. C. Anderson. Iran Nat. Mus. of Nat. Hist. (Muze'-ye Turikh-e Tabi'i), Tehran, MMTT 1032. First records for Iran. Extends the range from the Arabian peninsula into the contiguous lowland areas of southwestern Iran. (Anderson, 1963, Proc. California Acad. Sci., ser. 4(31): 477. Leviton and Anderson, 1967, Proc. California Acad. Sci., ser. 4(35): 181-182).

Submitted by STEVEN C. ANDERSON, Raymond/Callison College, University of the Pacific, Stockton, California 95211. ●

OPHEODRYS VERNALIS BLANCHARDI (Western smooth green snake). USA. NORTH DAKOTA: Slope Co: 23.0 km N Marmarch, 44.3 km W Amidon. 21 May 1977. G.H. Duckwitz and A.D. Heimerdinger. Verified by D.M. Hoope, Univ. of Minnesota, Morris herptile collection, UMM 77-006. New county record and extends the published range 135 km SW from Dunn Co, ND (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co.; Wheeler and Wheeler, 1966, The Amphibians and Reptiles of North Dakota, North Dakota Press).

Submitted by DAVID M. HOPPE, Biology Department, University of Minnesota, Morris, Minnesota 56267. ●

TANTILLA NIGRICEPS FUMICEPS (Texas Black-Headed Snake). MEXICO. NUEVO LEON: 9.5 km SSW Cerralvo at Rancho El 86. 13 July 1976. E.A. Liner, R.M. Johnson and A.H. Chaney. EAL 4147. First record for the state and the third for Mexico; the first two recorded from Tamaulipas (Mier and 16.3 km SW Reynosa on Mexico 40), approx. 64.4 and 128.8 airline kms NW and E of this locality (Smith and Smith, 1976, Synopsis of the Herpetofauna of Mexico. III. Source Analysis and Index for Mexican Reptiles; Liner and Dundee, Herpetol. Rev., in press).

Submitted by ERNEST A. LINER, 310 Malibou Blvd., Houma, Louisiana 70360 ALLAN H. CHANEY, Box 2092, Texas A&I University, Kingsville, Texas 78363 and RICHARD M. JOHNSON, 4170 Lantern Lane, Mobile, Alabama 36609. ●

Regional Society News

Second Regional Herp Society Conference at Tempe

The second Regional Herpetological Societies Conference, co-sponsored by the Arizona Herpetological Association and the SSAR will be held on 1 June 1978 at Arizona State University in Tempe. Conference co-moderators will be Jeffrey H. Black (Oklahoma Herpetological Society) and Tom R. Johnson (SSAR Board of Directors). Facilities will be made available to all state and metropolitan herpetological societies to display and sell their publications, solicit new memberships, communicate their goals, and meet with their colleagues from other regional herpetological societies. A program on topics of major interest to regional societies is planned and will be mailed to all individuals registering for the conference. Any societies interested in participating should contact the conference coordinator, as follows: Joseph T. Collins, Museum of Natural History, Univ. of Kansas, Lawrence, Kansas 66045, 913/864-4920 (Museum), 913/887-6549 (Residence).

The first RHSC, held last August in Lawrence, was a tremendous success. Over 70 representatives from 20 regional societies attended and participated. The SSAR strongly urges all regional societies to send representatives to Tempe on 1 June 1978. The SSAR needs your input to and support for future SSAR programs involving your organization.

Cincinnati Herp Society Formed

The Greater Cincinnati Herpetological Society (GCHS) was formed in 1977 as a vehicle for metropolitan Cincinnati herpetologists to exchange views and ideas about amphibians and reptiles, and to promote the welfare of these animals through education and responsible research. Membership is open to anyone with an interest in herpetology. Officers of the GCHS include the President, Vice-President, Secretary and Treasurer. The GCHS meets on the first Wednesday of each month at 7:30 p.m. at the Cincinnati Museum of Natural History, with the annual meeting set for October of each year. The GCHS issues a Newsletter which is sent to all members. Persons wishing to join the GCHS should consult the following Society dues schedule: Individual dues--$5.00; Family--$10.00; Student--$3.00; Corresponding--$3.00; and Institutional--$15.00. Dues should be sent to: Bill Maynard, GCHS Secretary, 2992 West McMicken Avenue, Apartment #3, Cincinnati, Ohio 45225.

News Notes

Letters to the Editor

22 September 1977
Reference: JNO/16/9/16/8

I have read with great interest the correspondence generated by Dr. James Lazell's letter condemning alligator translocation in the September 1976 issue of Herp. Review. I must say at the outset that my reaction to Lazell's letter was one of pure delight, and like C.A. Ross, I was disappointed by Bowler's reply.

What Lazell is advocating is that we adopt the principles of "genetic conservation", a refined form of "nature conservation". Genetic conservationists are rare birds, but are increasing in number very satisfactorily, despite a sad lack of published statement explaining what is meant by genetic conservation. At a recent symposium on African Wildlife research in Pretoria South Africa (July 1977) I defined it as the management of living things in such a way as to prevent unnecessary loss of genetic variation, to protect species from introgression and unnatural hybridization, and to conserve the genetic integrity of subspecies and ecotypes by discouraging ill-considered translocations, this, in the full recognition that the long-term conservation of life depends upon the maintenance of the rich store of genetic variation bequeathed to us by aeons of evolution.

The Audubon Society's alligator exercise, to my mind, offends against the principles of genetic conservation. We cannot gaily embark upon translocation lacking genetic knowledge, yet how much is known about the extent of genetic ecotypic variation in plant and animal species? Precious little. This is something the genetic conservationist is not afraid to admit. But to those who equate "translocation" with "conservation", genetic differences between populations are only recognized if they give rise to easily detectable external morphological differences. Subtle physiological adaptations or cryptic local variations generally pass unnoticed.

In the present state of our genetic knowledge, a cautious approach to translocation is stock from the nearest available geographic resource, or ecotypic equivalent. This would apply both to an area from which a species has been extirpated, and to an area where it is felt necessary to supplement a precariously surviving population. Subspecies, or even ecotype, mingling may be successful in the short-term but no one can predict the long-term effects. There are several recorded instances of animal populations being weakened by the addition of ill-adapted genetic material from a different environment.

When the natural increase of a protected species eventually brings it beyond the carrying capacity of its available habitat, sentimental taboos are often invoked to rule out the two sensible solutions--destruction or utilization--in favour of translocation. But it should be noted that we have an evolutionary responsibility to prevent genetic panmixia, whether a deleterious effect is anticipated or not.

Lastly, I disagree with Bowler and Blakeney on the definition of the term "exotic". The genetic conservationist's definition is that an exotic is a species, subspecies or ecotype which is native to an area located outside the area under review.

J. C. GREIG (Herpetologist), P.P. Officer-In-Charge (Research), Jonkershoe Nature Conservation Station, Private Bag 504, Stellenbosch 7600, Republic of South Africa.

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15 October 1977

In the December 1976 issue of Herpetological Review (just now received!) Donald Hahn attributes the first record of vertebrates in the diet of wild-caught Bufo to Campbell and Davis (1968) who asserted, "Vertebrates have not been reported in stomachs of field collected toads (genus Bufo)". This is untrue. Marx and Inger (1961) reported frogs and a skink in the stomachs of wild-caught Bufo regularis and a frog in the stomach of Bufo funereus, and it is not unlikely that earlier records may be found in literature unavailable to me here.

On the subject of Bufo eating snakes--about which Donald Hahn wrote his letter, I can add another record: One the night of 9th July, 1977 I found a female Bufo regularis in the act of swallowing, tail-first, a Leptotyphlops bicolor in a cement road-side gutter on the University of Ghana campus at Legon.

Vertebrates, usually anurans, don't seem too uncommon in the diet of other anurans; e.g., Marx and Inger (op. cit.) found vertebrates in the stomachs 12 of the 20 species of Zaire anurans with which they dealt. It is true that the incidence of vertebrates is usually low, but Marx and Inger found anurans in 21 of 106 (19.8%) stomachs of Ptychadena grandisonae, and Knoepffler (1976) has found cyprinodont fish in 62% of 169 food-filled stomachs of Aubria subsigillata. So perhaps one should not be surprised to find

vertebrates, even reptiles, forming a small but regular component in the diet of Bufo species.

LITERATURE CITED

Campbell, P.M. and W.K. Davis (1968). Vertebrates in stomachs of Bufo valliceps. Herpetologica 24: 327-328.

Knoepffler, L.-P. (1976). Food habits of Aubria subsigillata in Gaboon (Anura: Ranidae). Zool. Afr. 11: 369-370.

Marx, H. and R. Inger (1961). The food of amphibians. Exploration de Parc National de l'Upemba. Fasc. 64: 1-86.

B. HUGHES, Department of Zoology, University of Ghana, Legon, Ghana.

SSAR ADDRESS CHANGES

SSAR members should note the new addresses for two society officers, as follows:

J.P. Kennedy
Department of Anatomy
Texas Medical Center
University of Texas
Houston, Texas 77030

Harry W. Greene
Laboratories of Anatomy
School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19104

SYMPOSIUM ON THREATENED/ENDANGERED PLANTS AND ANIMALS TO BE HELD IN VIRGINIA

A symposium on the Endangered and Threatened Plants and Animals of Virginia is to be held May 19- 20, 1978 at Virginia Polytechnic Institute. For additional information please contact:

Donald Linzey
Center for Environmental Studies
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia 24061

MASSASAUGA DISTRIBUTION DATA NEEDED

Data on the distribution of the Eastern Massasauga (Sistrurus catenatus catenatus) in Pennsylvania is needed to complete a detailed map. Desired are the localities where species were collected, released, or observed within the boundaries of Pennsylvania. This information will be used to compile a detailed map on the distribution of (Sistrurus catenatus catenatus) in the state of Pennsylvania, in which the status of this species can be determined. Please write: Mark A. Stahle, 1000 4th Street, New Cumberland, PA 17070.

THE JAPAN SNAKE INSTITUTE JOURNAL

The Snake, journal of The Japan Snake Institute, publishes general papers on all aspects of the biology of snakes, including medical papers on snake venom and snakebites. Complete sets of the journal are available, at the following prices:

Vol. 1, no. 1, 1969	$2.00
Vol. 2, nos. 1-2, 1970	4.00
Vol. 3, nos. 1-2, 1971	4.00
Vol. 4, nos. 1-2, 1972	4.00
Vol. 5, nos. 1-2, 1973	4.00
Vol. 6, nos. 1-2, 1974	6.00
Vol. 7, nos. 1-2, 1975	6.00
Vol. 8, nos. 1-2, 1976	6.00
Vol. 9, no. 1, 1977	3.00

Individuals or institutions desiring to subscribe should write to: The Japan Snake Institute, Yabuzuka-honmachi, Nitta-gun, Gunma Prefecture 379-23, Japan.

UIMNH HERPETOLOGICAL COLLECTION

After 1 January 1978, Dorothy M. Smith will no longer be associated with the herpetological collection at the University of Illinois Museum of Natural History. Inquiries about its holdings and requests for specimen loans should, as in the past, be addressed to Dr. Donald F. Hoffmeister, Director, rather than to Mrs. Smith.

NEW BOOK AVAILABLE

The amphibian fauna of Peninsular Malaysia, by P.Y. Berry (1975). x+130 p., 91 text-figures, clothbound, is available for $10.00 postpaid from: International Book Service, 33, Julan 20/16 Petaling Jaya, Selangor, Malaysia.

NOTICE TO COLLECTORS ROUTING THROUGH THE ISTHMUS OF TEHUANTEPEC, MEXICO

Mr. Thomas MacDougall collected plants, mammals, reptiles, amphibians and a few other groups for several decades in Oaxaca and Chiapas, ranging far and wide from his headquarters in Tehuantepec and Oaxaca, before his recent death. His local companions on his forays became quite familiar with collecting and preservation techniques, and would be very glad to collect independently or in company with other field scientists. Arrangements can be made with them through a mutual friend, Sr. Ramon Fosado V., Porfirio Diaz 111, Oaxaca, Oax. (Editor's note: Prospective participants contemplating the above offer should be certain to obtain the necessary U.S. and Mexican collecting permits.)

THE SIGMA XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1976-77

Lyn C. Branch, Miami University, Oxford, Ohio. Aerobic and anaerobic respiratory strategies of three larval salamanders. $100.

James D. Brandt, Yale University. Ultrastructural studies of the infrared receptors of rattlesnakes. $250.

Daniel R. Brooks. University of Mississippi. Evolutionary history of the digenetic trematodes of crocodilians. $300.

Jonathan A. Campbell, University of Texas at Arlington. The systematics, distribution, and ecology of the middle American highland pit vipers, Bothrops barbouri and B. godmani. $100.

Keith A. Christian, Colorado State University. Determinants of burrow site selection by the Galapagos land iguana. $100.

Deborah T. Crouse, University of Wisconsin. Microhabitat selection and activity levels in the wood frog (Rana sylvatica). $100.

Frank J. Denaro, State University of New York at Stony Brook. An electrophysiological study of the pineal body in Rana temporaria. $100.

Sean D. Farley, College of Idaho, Caldwell. Feeding habits of Uta stansburiana elegans (Yarrow), from the Central Desert of Baja California, Mexico. $100.

William F. Gergits, State University of New York at Albany. Interspecific aggression and territoriality as mechanisms for competitive exclusion in two species of terrestrial salamanders. $100.

Paul E. Hertz, Harvard University. Altitudinal variation in West Indian Anolis lizards. $100.

John B. Iverson, University of Florida. Systematics and ecology of the mud turtles (genus Kinosternon) inhabiting the interior drainage basins of the Mexican plateau. $200.

Cynthia M. Kagarise, University of Michigan. An evolutionary approach to the mating systems and reproductive behavior of two anurans: The Yosemite toad (Bufo canorus) and the black toad (B. exsul). $100.

George M. Labanik, Southern Illinois University. An experimental study of apostatic selection on the mountain dusky salamander, Desmognathus ochrophaeus. $100.

Bradford Lister, University of Massachusetts. Environmental variation and community structure in Anoline lizards. $100.

Mark B. McCune, University of Michigan. Reproductive strategies of the spring peeper. $125.

Mark B. McCune, University of Michigan. Continuation of the research on reproductive strategies of the spring peeper. $100.

Donald A. Merkle, Longwood College, Farmville, Virginia. Genetic

variation in isolates of Plethodon nettingi. $150.

Scott M. Moody, University of Michigan. Consequences of continental drift on the evolutionary history of the lizard family Agamidae. $150.

Stephen D. Parris, Iowa State University. Home range and individual spacing relationships in the marine toad, Bufo marinus. $100.

Jerald H. Reynolds, North Carolina State University. Population dynamics of Cemophora coccinea and Tantilla coronata in southeastern North Carolina. $100.

Raymond E. Sicard, Boston College. Adenylate cyclase activity in the regenerating forelimbs of the adult newt, Notophthalmus viridescens. $100.

Douglas Simmons, University of Florida. Ecological energetics of the American alligator. $50.

E. Eugene Spears, University of Florida. Biochemical systematics in the genus Amphiuma (Urodela). $100.

Kurt Steinwascher, Duke University. Identification of the tadpole intestinal alga and its distribution in North Carolina species. $150.

Myrna E. Watanabe, New York University. The ethology of the American alligator in its natural habitat. $100.

Michael J. Wong, University of California, Los Angeles. An ecological study of the incursion of Sonoran Desert lizards into the Cape region of Baja California, Mexico. $100.

ERRATA

HR 8(3), p. 108, col. 2 (near bottom): M.A. DEL TORO should read M. ALVAREZ DEL TORO.

We wish to acknowledge with gratitude the contributions of the following Contributing and Sustaining Members whose generosity added $870 to our fiscal 1977 income--a sum sufficient to guarantee another Circular!

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The following contributed a total of $378 to the Conservation Fund.

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Proposed Amendment to SSAR By-Laws

In accordance with Article IX of the SSAR By-Laws, the SSAR membership is herewith notified that the SSAR Board of Directors has approved the following proposed amendment to the By-Laws:

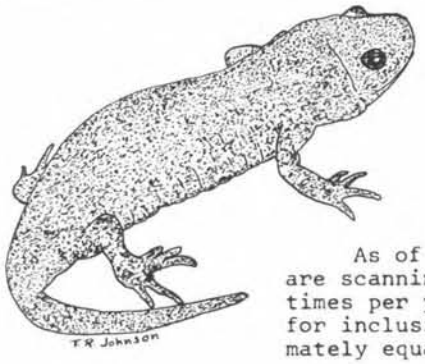
...that wherever they appear in the SSAR By-Laws, the words "Chairman, Chairman-elect, immediate past Chairman" be changed to "President, President-elect, immediate past President" respectively, said amendment to become effective on 1 January 1979.

The above proposed amendment will be presented and discussed at the Business Meeting during the 21st Annual Meeting of the SSAR at Arizona State University, Tempe, Arizona, from 31 May to 6 June 1978. A ballot will be mailed to the entire SSAR membership within one month following the SSAR Annual Meeting.

Stephen R. Edwards
SSAR Secretary
15 March 1978



Oklahoma has everything for the herpetologist. As well as roads leading to Paris, Texas, we also have our own Frogville. Frogville is in southeastern Choctaw County and dates back to 1897 when it took its name from the great plethora of frogs so large they reputedly "ate young ducks". Photograph by Jeffrey H. Black.



Current Literature

As of January, 1978, approximately 70 searchers are scanning 400 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

Richard D. Worthington
Current Literature
Department of Biological Sciences
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El Paso, Texas 79968

A

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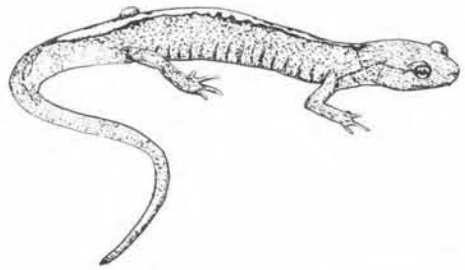
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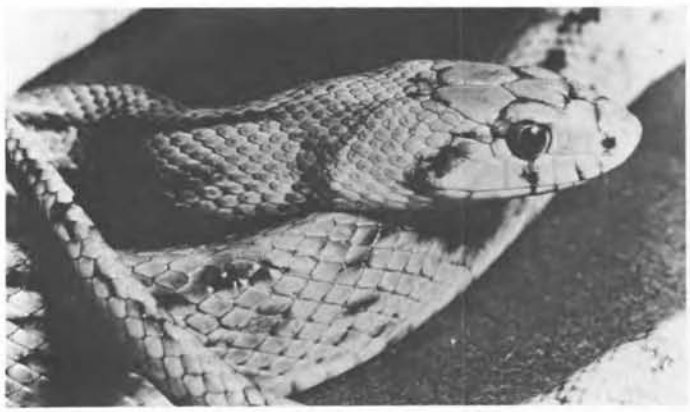
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Annual Meeting Symposium: Topics and Participants

During the first week of June, 1978, a joint annual meeting of The Society for the Study of Amphibians and Reptiles (SSAR), Herpetologists' League (HL) and the American Society of Ichthyologists and Herpetologists (ASIH) will be held at Arizona State University in Tempe, Arizona. A symposium dealing with the reproductive biology of captive reptiles will be presented with a volume of the proceedings to follow. The symposium will be divided into two parts: the first will deal with environmental aspects and problems likely to occur with captive reptile populations whereas the second part will address reproductive strategies, behavioral aspects and successful breeding programs, especially concerning endangered species. Some of the participants are as follows: Historical Perspectives: Dr. Roger Conant (University of New Mexico), Captive Maladaption Syndrome: Dr. Daniel Cowan (UTMSH), Temperature and Light: Dr. Philip Regal (University of Minnesota), Viral-Mycotic-Neoplastic Disease Agents: Dr. Elliot Jacobson (University of Florida), Antibiotic Therapy: Dr. Mitchell Bush (National Zoo), Protozoans: Dr. Raymond Napolitano (Bronx Zoo), Helminths: Dr. Dennis Deakins (Scott and White Hospital), Ectoparasites: Dr. Richard Loomis (California State University), Nutrition: Dr. Joseph Bielitzki (Topeka Zoo), Anesthesia: Dr. Emil Dolensek (Bronx Zoo), Radiology and Surgical Techniques: Dr. Michael Herron (Texas A & M University), Post Mortem Evaluation: Dr. Richard Montali (National Zoo), Closing Remarks: Dr. Murray Fowler (University of California, Davis), Reproductive Strategies: Dr. Henry Fitch (University of Kansas), Behavioral Requirements: Dr. Charles Carpenter (University of Oklahoma), Methods for Inducing Reproduction: Drs. David Crews and Leslie Garrick (Harvard University, Bronx Zoo), and Exhibition and Management Techniques: Mr. J. Kevin Bowler (Philadelphia Zoo). Presentations dealing with various breeding programs include: Chinese Alligator: Mr. John Behler (Bronx Zoo), American Alligator: Dr. Ted Joanen (Louisiana Wildlife and Fisheries Commission), Morelet's Crocodile: Mr. R. Howard Hunt (Atlanta Zoo), West African Dwarf Crocodile: Mr. Bern Tryon (Ft. Worth Zoo), Galapagos Tortoise: Dr. James Bacon (San Diego Zoo), Sea Turtles: Dr. David Ehrenfeld (Rutgers University), Gekkonid and Helodermatid Lizards: Mr. Ernie Wagner (Woodland Park Zoo), Boids: Mr. Thomas Huff (Reptile Breeding Foundation), Colubrid Snakes: Dr. Glenn Slemmer (University of British Columbia), and Kingsnakes: Dr. Richard Zweifel (American Museum of Natural History).

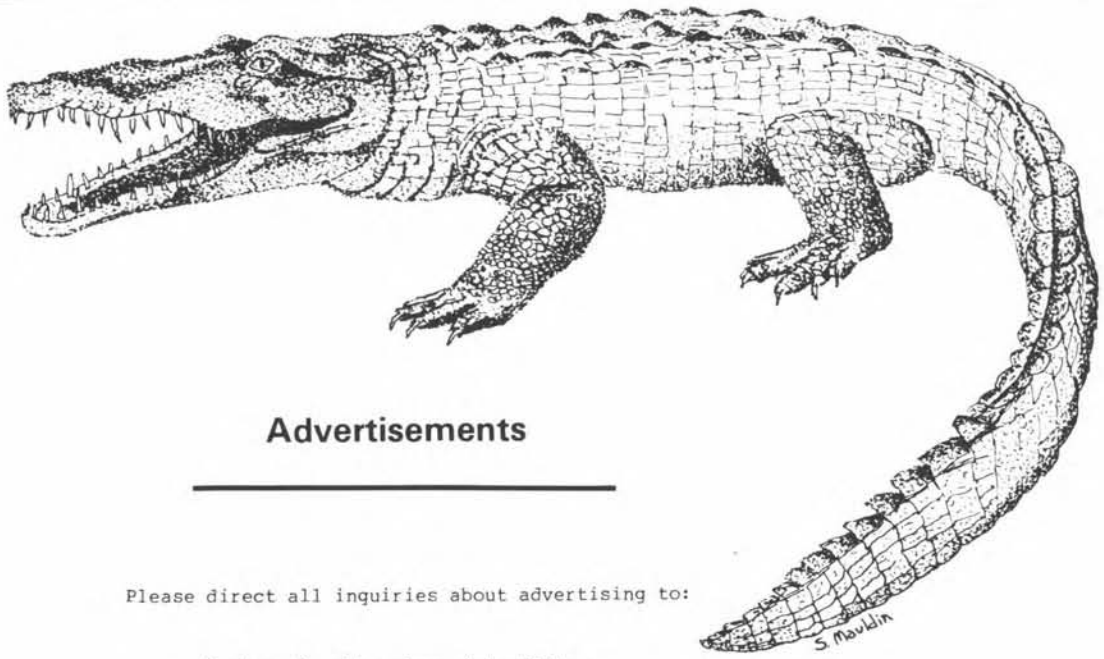
Anyone interested in these topics is urged to attend.



An Elaphe scalaris (Carnegie Museum #54888) collected on 21 June 1971 by S.D. Busack at the Base Naval de Rota, Cadiz Province, Spain. Photograph by Stephen D. Busack.



A Hyla crepitans observed during July 1977 at the Asa Wright Nature Center in Trinidad. Photograph by Henry J. Cohen.

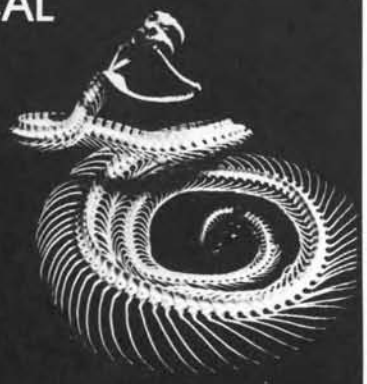


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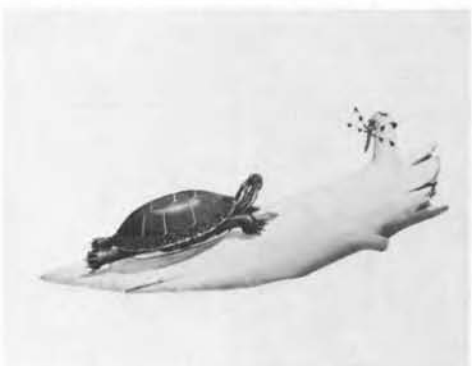


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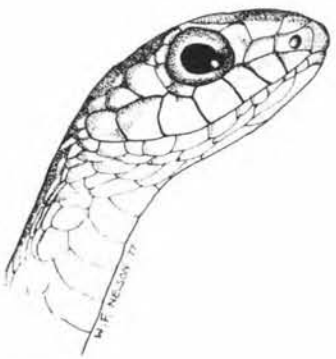
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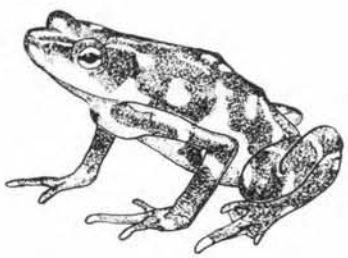
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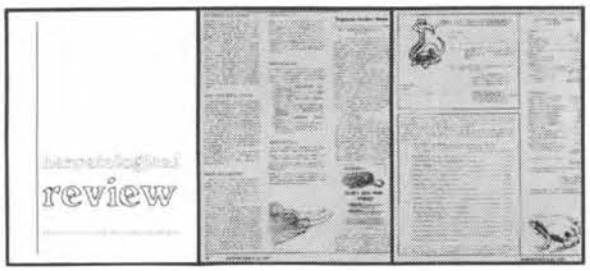
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journal of herpetology



The Journal is the Society's official scientific publication. It is international in scope and broadly covers amphibian and reptilian biology. Manuscripts of any length on original research or reviews, whether by members or not, are invited. Most articles are in English and are often extensively illustrated with photographs, drawings and color plates.

herpetological review



Since 1967, Herp Review has been the principal newsletter for the herpetological community. It contains newsnotes about people, institutions, programs and events of interest, including conservation news, book reviews, regional society news, articles on care of captive specimens, and ads.

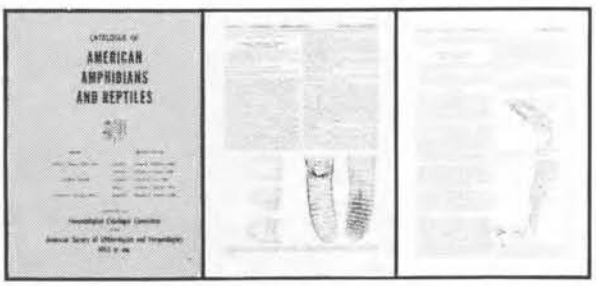
A primary service of Herp Review is publication of a list of "Current Herpetological Titles" to keep readers abreast of the literature. Titles are obtained from a regular search of hundreds of biological journals by members of the Society.

herpetological circulars



This series started in 1973 and is intended to serve the broadest spectrum of people with an interest in herpetology. Circulars are sent to all members, and may be purchased by museums, clubs hospitals and governmental agencies. Titles of available Circulars include: A Guide to Preservation Techniques for Amphibians and Reptiles; Guia de Tecnicas de Preservacion de Anfibios y Reptiles; Collections of Preserved Amphibians and Reptiles in the United States; A Brief Outline of Suggested Treatments for Diseases of Captive Reptiles; and, Endangered and Threatened Amphibians and Reptiles in the United States.

ssar catalogue of american amphibians and reptiles



The Catalogue is a series of loose-leaf accounts, each giving a wealth of information about a particular genus or species, including common and scientific names, a description, fossil records, a distribution map, and a literature survey. It is an essential reference for all biologists using amphibians and reptiles in research.

To date, over 190 accounts have been issued. Twelve accounts are published each year for $6.00 ($12.00 for institutional subscriptions). This series is not provided as part of the membership; however, standing orders can be made on the SSAR dues form.

facsimile reprints



This series makes available once again important papers and books on amphibians and reptiles; all are exact copies with new introductions, indexes or other features. Members receive the smaller booklets without charge; in the past, authors included were Boulenger, Cope, Eschscholtz, Gray, LeConte, Linnaeus, Tschudi, and Rafinesque.

SSAR also publishes a book-length series; all members receive a special price discount. Titles include: The Bulletin of the Antivenin Institute of America, Camp's Classification of Lizards, Bojanus's Anatome Testudinis, Wiegmann's Herpetolgica Mexicana, Williston's Osteology of Reptiles, Sowerby & Lear's Tortoises, Turtles and Terrapins, Dunn's Salamanders of the Family Plethodontidae, Tschudi's Classification der Batrachier, McIlhaney's The Alligator's Life History, and Holbrook's North American Herpetology.

other publications

Two other series are now discontinued but back issues are still available. Both were published by SSAR's predecessor, The Ohio Herpetological Society. In spite of the Society's geographically-associated name, the scope of these series (Journal, Special Publications) is international in character; all publications are illustrated.

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HERPETOLOGICAL REVIEW EDITORIAL POLICY

The following statement-of-purpose appeared in the Introduction to the first issue of Herpetological Review in 1967 (Corson Hirschfeld, Editor):

> "Herpetological Review incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the Review will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to all persons in herpetology and we hope all members will find it informative and entertaining."

Now in its tenth year, Herpetological Review remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the Journal of Herpetology -- see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Authors are urged to write the editors before submitting feature-length articles. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles are desired. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

Reprints of contributions can be supplied if desired. Contributors will receive ordering information prior to publication of their material. Herpetological Review will accept commercial advertising. Rates and copy information are available from the editors.

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Membership is open to anyone interested in amphibians and reptiles. Members have voting privileges in the Society. They receive the Journal of Herpetology (four issues per year), Herpetological Review (four issues per year), Herpetological Circulars, and several Facsimile Reprints in Herpetology. Members may purchase other Society publications at reduced rates.

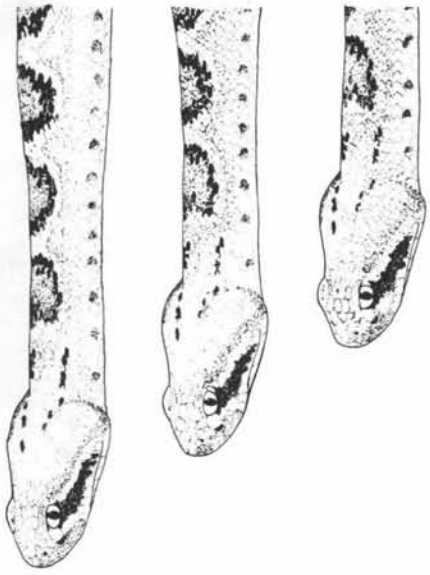
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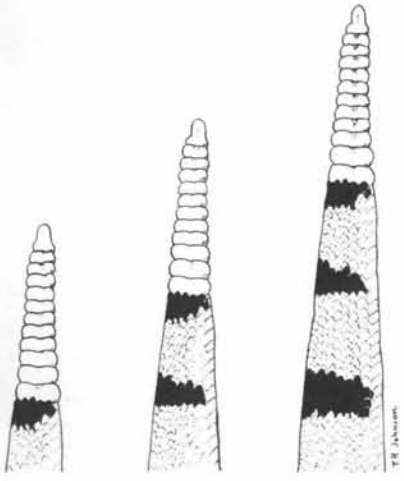
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Herpetological Review

Volume 8 December 1977 Number 4

Contents

SSAR ANNUAL MEETING NEWS
SSAR 20th Annual Meeting in Lawrence, Kansas, by S. R. Edwards 114

FEATURE ARTICLES
Clutch size and size of young in the Mexican garter snake, Thamnophis melanogaster (Reptilia, Serpentes, Colubridae), by N. B. Ford and R. Ball 118
A yellow albino Desmognathus fuscus from western Massachusetts, by T. F. Tyning 118
Leopard frog supply, by J. T. Bagnara and J. S. Frost 118
A kyphotic individual of Lissemys punctata punctata (Bonnaterre), by P. L. Duda and V. K. Gupta 119

REGIONAL SOCIETY NEWS
First RHSC a huge success, by S. D. Garber 120
French Herpetological Society 122
Maryland Herpetological Society 123
New York Herpetological Society 123
Northern Ohio Association of Herpetologists 123

HERPETOLOGICAL HUSBANDRY
Keratophagy in the slender vine snake, Uromacer oxyrhynchus, by J. D. Groves and W.Altimari 124
A propagation program for Chinese alligators (Alligator sinensis) in captivity, by J. Behler 124

GEOGRAPHIC DISTRIBUTION
Range extensions and new county records of some Illinois amphibians and reptiles, by H. D. Walley 125
The presence of the scarlet kingsnake, Lampropeltis triangulum elapsoides Holbrook (Reptilia, Serpentes, Colubridae), in the Florida Keys, by S. B. Hedges 125
Distributional maps of reptiles of Iran, by H. H. Schleich 126

CONSERVATION
Projecto Venezolano sobre cocodrilos (Venezuelan Crocodile Project), by Y. Ramirez, C. C. Castillo and S. J. Gorzula 130
Legislation, by T. J. Berger 130

NEWS NOTES 131

CURRENT LITERATURE 133

ADVERTISEMENTS 145

PHOTOGRAPHS 147

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Annual Meeting News

SSAR MEETING IN LAWRENCE WELL ATTENDED

The 20th Annual Meeting of the Society for the Study of Amphibians and Reptiles, held at The University of Kansas in Lawrence from 7-13 August 1977, was a huge success. Over 300 herpetologists from throughout the world registered for the meeting, which was held concurrently with the Herpetologists' League's annual get-together.

Socials, symposia, conferences and paper sessions were enthusiastically attended and enjoyed by the participants.

Highlights of the SSAR Business Meeting held on 10 August follow.

Chairman Max Nickerson opened the meeting at 4:30 p.m., noting that the SSAR was in need of volunteers for committee positions and other jobs important to the future development of the Society. Max stated that if the Society was to continue to provide the kinds of services and benefits to its members that it has in the past, it was essential that more members get involved. If you would like to help please contact either Max Nickerson, Chairman or Joe Collins, Chairman-elect.

Treasurer's Report: Henri Seibert stated that the membership had increased by 200 over last year at this time. While the financial status of the Society was sound, Seibert reported that the Board had voted to raise the dues to: $10.00/year for students, and $12.00 /year for regular membership. This increase in dues was dictated because of the desire to provide more services and publications to the members during the forthcoming year. Catalogue accounts will still be prepared at the rate of 15/year at a subscription rate of $6.00/ year.

Nickerson presented Henri Seibert with a leather-bound collection of letters prepared by past and present officers and editors. This presentation was made in gratitude for the services that Henri has provided the Society over the past years. Clearly the SSAR would not be able to provide the level of services it does to its members if we didn't have a treasurer like Henri. His dedicated service to the Society should be recognized by all of the members, not just those few that face the annual challenge of negotiating a new budget. Henri, thanks!!!!

Facsimile Reprints: Kraig Adler reported that in the past year his committee had overseen the publication of two book-length reprints: Holbrook's Herpetology of North America and McIlhenny's Life History of the Alligator. Further, the index to the collected works of Boulenger is now available.

In the future the committee is planning to publish the collected papers of Van DenBergh, Gloyd's Rattlesnakes, Genera Sistrurus and Crotalus, Cope's Batrachia of Central America and Mexico, Espada's Vertebrados del Viaje al Pacifico: Batracios, and Spix's collected works on Brasilian herpetology, and Vol. 3 of Wright and Wright's Handbook of Snakes.

Kraig requested comments and suggestions from the members concerning future facsimile reprints and the direction of the program.

Herpetological Review: George Pisani, Co-editor, reported five issues of Herp. Review may be published during the forthcoming year. If this is necessary, one issue will be dedicated to the Tempe meetings and will carry the abstracts for the papers. Also, during the next year Herp. Review will carry an estimated 2000 citations under Current Titles. George asked that any time members purchase products advertised in Herp Review, they inform the manufacturer that they learned about their product in Herp. Review. This will help sell advertising in the future and help keep the dues at a relatively low level.

Herpetological Circulars: George, as Editor of Herpetological Circulars, noted that during the forthcoming year he hoped that booklets would be published on: Common Names



The herpetological art exhibit held during the meeting was tastefully organized and displayed by Linda Trueb (photograph by Bob Gillum, KU Division of Continuing Education).



Roger Conant surveys with amazement the social antics of his assembled colleagues at the picnic (photograph by Larry Miller).

of Amphibians and Reptiles in North America, Longevity Records of Captive Reptiles, and Albinism in Herps.

Jim Murphy, Chairman of the Regional Society Liaison Committee reported that the Regional Society Conference held in conjunction with these meetings was a fantastic success; more than 70 participants had attended. Further, most people had stated that the experience was very valuable and that if the SSAR sponsored similar conferences in conjunction with their meetings in the future, they would be very interested in attending. Jim also reported that over 30 people from zoos were attending these meetings, and most felt that they were very rewarding.



Janice Perry displays one of the animals from the excellent live exhibit which was set up and sponsored during the meetings by the Kansas Herpetological Society (photograph by Larry Miller).

Jim reported that, because of the growing interest in the SSAR of people from zoological parks, he had proposed a symposium around the theme "Animal Husbandry" for the Tempe meetings next year. The Board of the Society has endorsed this proposal and Jim stated that he will proceed with the arrangements.

Max Nickerson reported that the Nominating Committee had presented the following slate of candidates for the up-coming elections:

Chairman: Ron Altig
Margaret Stewart
Secretary: Stephen Edwards
Treasurer: Henri Seibert
Directors: Jeff Black
Marty Crump
Carl Gans
John Lynch
Richard Wassersug

Max called for nominations from the floor. In the absence of further nominations, it was moved and seconded that the slate of candidates presented by the Nominating Committee be accepted for the forthcoming elections. THE MOTION PASSED UNANIMOUSLY.



Annual Meeting, 1978: Max announced that the SSAR meeting will be held from 31 May through 7 June, 1978 at Arizona State University, Tempe, Arizona. The Herp League and ASIH will also be meeting in Tempe at the same time. This will be the first time that all three herpetological societies have met simultaneously at one site. Jack Fouquette, chairman of the local committee, has made arrangements for dorm space to be available for participants.

Max also reported that the board had approved the meeting site for the 1980 meeting: Milwaukee, Wisconsin; Milwaukee Public Museum, host. The 1979 meeting will be convened at Knoxville, Tennessee with the University of Tennessee serving as host. Sandy Echternacht is the chairman of the local committee.

Student Prize: Meg Stewart, Chairman of the Student Prize Committee reported that George Labanik had been selected as the winner for his paper entitled: "Prey availability, consumption and selection in the cricket frog, Acris crepitans (Amphibia, Anura, Hylidae). Jour. Herpetology 10(4): 293-298. This prize carries a $100.00 award.

Secretary's Report: Steve Edwards reported that during the past year he had successfully completed the paper work for incorporation of the Society in the State of Kansas. With this step completed he hoped that the SSAR could secure a ruling from the IRS concerning its tax status as a non-profit corporation during the next year.

Steve noted that the Society's membership brochure was being redesigned and that copies would be available shortly. Ballots for the forthcoming election should be mailed out by the end of September.

Grants-in-Herpetology. Max reported that the board had requested that he establish a committee to draft the protocol under which a mini-grant program might be established and managed by the SSAR. At present the program is conceived as being similar to the Sigma Xi grant program; however, it would support grants in four areas: Animal Husbandry, Conservation, Regional Societies, and Student Research. This committee will present its recommendations at the Tempe board meeting.

Resolutions Committee: John Iverson, Chairman, presented the following resolution for consideration by those in attendance:

WHEREAS, the University of Kansas, Vice Chancellor William Argersinger, Conference Coordinator Rich-



Edward H. Taylor recounts memories of wilder herpetological meetings he has attended (photograph by Bob Gillum, KU Division of Continuing Education).



Dick Vogt relaxes in the barn at the meeting-sponsored picnic near his special stall (photograph by Larry Miller).

ard Treece, and local committee Chairperson William Duellman have provided generous hospitality in hosting our annual meeting, and

WHEREAS, Linda Trueb, Joe Collins, Henry Fitch, Steve Edwards, George Pisani, Rose Etta Kurtz, Tom Swearingen, Ruth Gennrich, Cathy Dwigans, Eva Hudson, Roberta Eaton, Ruth White, John Bucher, Barbara Paschke, Annie Simpson, Kay Shortridge, Chuck Jones, Sally Cool, Tom Berger, Dave Cannatella, Luis Malaret, Michele Edwards, Julian Lee, Jaime Pefaur, Greg Pregill, Becky Pyles, and Terry Schwaner, of this institution have worked like #@%%, to contribute to the success of the meetings, and

WHEREAS, particular recognition is due Dr. Edward H Taylor, in his capacity as honorary Chairman of the local committee, and more importantly for his outstanding and unselfish contributions to the herpetological community for more than five decades; and,

WHEREAS, Kelly Irwin, Janice Perry, Eric Rundquist, Shelly Skie, Larry Miller, Stan Roth, Marjorie Perry, Scott Palmer, and Andrea Stammler of the Kansas Herpetological Society; Jan Caldwell of the State Biological Survey of Kansas; Robert Clarke and Jim Knight of Emporia State University; David Grow and Peter Gray of Sedgwick County Zoo; and Melissa Burtt, Gary Clarke, and John Wortman of the Topeka Zoo, also deserve recognition for efforts on our behalf, therefore

BE IT RESOLVED, that the SSAR and HL sincerely thank these institutions and persons for a job well done!

It was moved and seconded to adopt the resolution as presented. THE MOTION PASSED WITH UNANIMOUS APPLAUSE.

In response to a request for comments from the floor it was recommended that in the future the Nominating Committee should give special consideration to non-U.S. citizens for at least one position on the board.

It was also suggested that the Society should look into ways of accumulating lists of student theses that could be made available to the members. The Society for Vertebrate Paleontology supports a similar program that could be used as a model.

With no further comment from the floor, Max Nickerson adjourned the meeting.

Respectfully submitted,

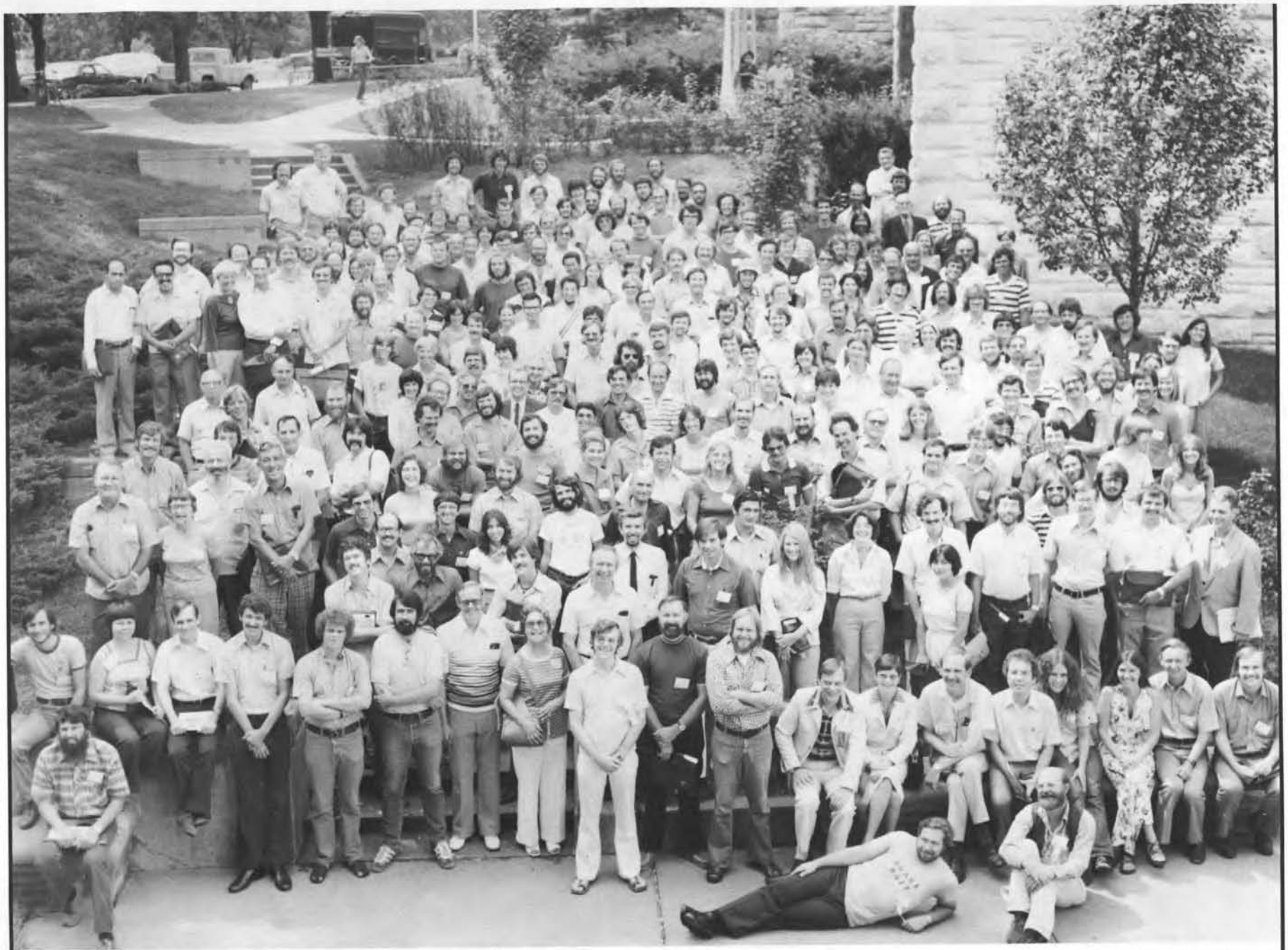
Stephen R. Edwards
Secretary



John Applegarth is a handsome prince, but Delfi Messinger seems worried about the frog (photograph by Larry Miller).



Participants: Symposium on the South American Herpetofauna: Its origin, evolution, and dispersal. 1st Row (L-R): Alberto Veloso M. (Santiago, Chile), Beryl Simpson (Washington, D.C.), Jaime E. Pefaur (Lawrence, Kansas), Ana Maria Baez (Buenos Aires, Argentina), Jose M. Cei (Mendoza, Argentina). 2nd Row: Lars Brundin (Stockholm, Sweden), Thomas E. Lovejoy (Washington, D.C.), Donn E. Rosen (New York, New York), Jorgen H. Haffer (Wies-baden, Germany), Thomas H. Fritts (San Diego, California), Ramon Formas (Valdivia, Chile), Raymond F. Laurent (Tucuman, Argentina). 3rd Row: William E. Duellman (Lawrence, Kansas), James R. Dixon (College Station, Texas), Marinus S. Hoogmoed (Leiden, Netherlands), John D. Lynch (Lincoln, Nebraska), W. Ronald Heyer (Washington, D.C.), Michael J. Tyler (Adelaide, Australia), Jose M. Gallardo (Buenos Aires, Argentina).

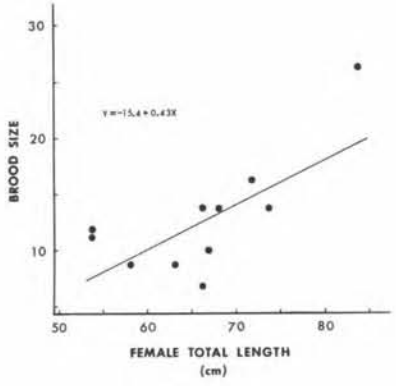


The meeting participants assembled in a natural, unstructured grouping at the north edge of the Museum of Natural History. Persons who did not attend the meeting should note the living trees in the background, proof positive that Kansas is not all wheat and corn fields.

CLUTCH SIZE AND SIZE OF YOUNG IN THE MEXICAN GARTER SNAKE, THAMNOPHIS MELANOGASTER (REPTILIA, SERPENTES, COLUBRIDAE)

Reproductive data from eleven female Mexican garter snakes, Thamnophis melanogaster, from Lago Quitzeo, Michoacan, Mexico were collected while the junior author was studying the courtship behavior of this species. Clutch size and size of young at parturition have not been previously recorded for T. melanogaster although these are known in many other garter snakes (Fitch, 1970).

The reproductive data we collected (Table I) were analysed by linear regression of clutch size and mean total length of young against the females' total lengths (snout vent lengths were unavailable) and mean total length of young versus clutch size. Correlation coefficients from each regression were calculated.



Clutch size showed a high positive correlation with the total length of the female in this species ($r = 0.74$, $P < 0.01$, Fig. 1). This is as expected; the larger the female the larger brood its body can safely produce. A positive correlation of mean size of the young to females' size would indicate that as the female gets larger, fitness is increased by producing larger young rather than just more young. However, though the correlation of the mean length of young of this species with the size of the female is positive, it is not significant at the 0.05 level ($r = 0.54$, $P < 0.08$). The mean size of the young is not correlated at all to the brood size ($r = 0.20$, $P < 0.55$). The significance of the size of young snakes at parturition can not be evaluated here due to the low sample size, but the possibility that larger snakes produce larger young is still a viable hypothesis and should be tested.

LITERATURE CITED

Fitch, H. 1970. Reproductive cycles in lizards and snakes. Univ. Kansas Publ. Mus. Nat. Hist. 52: 1-247.

NEIL B. FORD, Department of Zoology, Miami University, Oxford, Ohio 45056, USA and ROBERT BALL, Department of Zoology, University of Oklahoma, Norman, Oklahoma 73069, USA.

TABLE 1. Reproductive data from 11 Thamnophis melanogaster.*

Parturition date	Female total length (cm)	Clutch size	Mean total length of young at birth (cm)	
			♂	♀
June 5 - July 16 1973	65.9 ± 8.8	12.9 ± 5.33	20.7 ± 1.57	20.0 ± 1.77

*Mean ± one standard deviation.

A YELLOW ALBINO DESMOGNATHUS FUSCUS FROM WESTERN MASSACHUSETTS

Channel and Valentine (1972) describe an amelanic Desmognathus fuscus from West Virginia. Their description fits closely that of a specimen collected by myself and Steve and JoAnn O'Neil of the Western Massachusetts Herpetological Society, on 13 Oct., 1975 at Mt. Tom, Hampden County, Mass.

The collection site is a seepage area that ranges from a flowing brook in Spring and during heavy rains to a moist, barely moving swamp in mid-summer and during droughts. Many rocks and leaves clog the channel in the predominantly Oak-Hickory forest where D. fuscus is abundant in the wet areas.

Many normally colored specimens were found the same day as the amelanic specimen. Alive, the dorsal coloration is close to Ridgeway's (1886) Tawny (Plate V). In different light, the color is closer to Raw Sienna (Plate V) or Tawny Ochraceous (Plate V). A more precise color description is made by using the Munsell Book of Color (1963) and the Munsell Notation System (Munsell Color Co., Inc., Baltimore). With the specimen under a MacBeth "Lablite" unit (MacBeth Daylighting Corp., Newburgh, N.Y.) and the control set on "Daylight," the value for the overall dorsal coloration is assigned 5YR 5/5, indicating the hue, value, and chroma. At capture, the specimen was 72 mm long (37 mm snout-vent).

Presently (July 1977), the animal is being maintained in a terrarium. Its color has not changed nearly two years after capture. It does not seem to behave differently towards light than the normally colored D. fuscus kept with it.

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LEOPARD FROG SUPPLY

The northern leopard frog Rana pipiens has been for many years the principal amphibian used for biomedical research and teaching. Unfortunately, such frogs of northern origin are no longer available in significant quantities and biological supply houses have turned to other regions, notably northwestern Mexico, as a source of frogs. The biology of these Mexican frogs is clearly different from that of the northern R. pipiens, a matter that was extensively discussed at a symposium on the laboratory frog (1), which was attended by major commercial frog suppliers. Recently it has been shown that, in the region of northern Sinaloa, Mexico, where most of these leopard frogs are collected, no R. pipiens are to be found. Instead, there exist two sympatric species of leopard frogs, R. berlandieri forreri and R.magnaocularis (2). Commercial collections made in this area from October through March contain about 80 percent R. berlandieri forreri and 20 percent R. magnaocularis. During other times of the year even fewer R. magnaocularis are found in these collections. Northeastern Mexico has now become an additional source of leopard frogs, and collections from this region are composed of R. berlandieri berlandieri.

For reasons unclear to us, commercial houses are now supplying

Mexican leopard frogs designated as "Rana pipiens berlandieri." This is an unsatisfactory circumstance, not only because of the erroneous nomenclature, but because articles are beginning to appear about research, the meaning of which will be questionable, since the actual species on which the work was done is not known. Of more serious consequence is the fact that some investigators may think that they are working on R. pipiens when actually they are not. If there were no significant physiological differences among the various species of leopard frogs, the error in nomenclature would present no major problem; however, this is not the case. It has been pointed out in one demonstration of such physiological differences that melanophores of frogs of southern origin (R. berlandieri forreri) contain a preponderance of b-adrenergic receptors, while those from northern frogs (R. pipiens) contain mostly a-adrenergic receptors (3). Other physiological differences among leopard frog species include variations in reproductive cycles, in temperature tolerance, and in enzyme composition. The last is well manifested in the heterogeneity of isozyme patterns among leopard frog species (4).

We wish to emphasize that the various leopard frog species possess different biological characteristics that must be considered when they are used for experimentation.

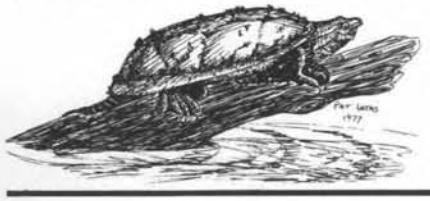
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A KYPHOTIC INDIVIDUAL OF LISSEMYS PUNCTATA PUNCTATA (BONNATERRE)

Hump-backed (kyphotic) soft-shelled turtles have been known for many years. In their accounts of such abnormalities in turtles, Gressitt (1937, cited in Smith, 1947) and Smith (1947) noted records in the literature of kyphosis in two Asian and four American turtle species, all of which incidentally belong to the genus Trionyx Geoffroy (Family: Trionychidae). The only other genus in which a deformed carapace has been reported (Cagle, 1954) is Pseudemys (Family: Testudinidae), which is neither a soft-shelled turtle nor is the deformity kyphotic in nature. There is, however, no record of kyphosis in any Indian turtle so far.

A single kyphotic Lissemys punctata punctata, along with five normal individuals, was secured by the junior author at Ranbir-Singh Pura, 24 km south of Jammu, on January 25, 1976, by digging them out of their hibernation holes in a shallow pond. On identification, all the specimens of the catch turned out to be the members of the species L.p. punctata. All the specimens are deposited in the museum of Department of Bio-Sciences, University of Jammu, as Nos. JUBR 36-41 (the kyphotic specimen being No. JUBR 41). The height, length and width of these and 14 other museum specimens (Nos. JUBR 22-35), collected locally, are provided in Table 1. The height of the specimen was determined by measuring the perpendicular distance between the end of the rib opposite the highest elevation and the crest of the elevation. The length of the carapace was measured from anterior to posterior border and the width of the carapace as the maximum transverse dimension.

Lissemys punctata punctata is distinctive in the proportions of its carapace. It is invariably longer than broad (Fig. 1). In a sample of 19 normal specimens (Table 1), the mean length of the carapace is 169.9 mm (range 105-238 mm), the mean width 156.3 mm (range 99-217 mm). The width to length and width to height ratios in the normal individuals are 0.93 (range 0.87-0.95) and 3.1 (range 2.7-3.4) respectively. In the kyphotic individual, on the contrary, the carapace is broader than long, being only 160 mm in length against a width of 175 mm. The afore-said ratios are also different.

The hump in the odd specimen forms a smooth curve in the antero-posterior axis, being maximally elevated around 3rd and 4th neurals. When viewed from in front (Fig. 2), the hump presents two prominent costal swellings, one on either side of the 3rd/4th neurals, where the costal plates appear to be elevated above the general level of the neurals. In transverse sectional view, the lateral curvatures show a sharp and steep gradient of near 50 degrees with the horizontal, whereas, in the antero-posterior axis (Fig. 3),

Table 1. Data on Lissemys punctata punctata

Cat. No. JUBR	Sex	Width in mm.	Length in mm.	Ratio width/ length	Height in mm.	Ratio width/ height
41*	F	175	160	1.09	70	2.5
22	F	217	238	0.91	70	3.1
23	F	138	144	0.95	45	3.0
24	F	137	144	0.95	46	2.9
25	M	159	174	0.91	56	2.8
26	M	140	150	0.93	43	3.2
27	M	166	182	0.91	58	2.8
28	M	168	188	0.88	57	2.9
29	M	192	206	0.92	66	2.9
30	M	150	163	0.92	43	3.4
31	F	175	200	0.87	60	2.9
32	F	147	156	0.94	43	3.4
33	F	124	148	0.91	45	3.0
34	M	127	138	0.92	37	3.4
35	M	180	197	0.94	58	3.0
36	F	185	210	0.88	62	2.9
37	F	99	105	0.93	32	3.1
38	M	160	170	0.88	54	2.9
39	M	149	157	0.94	44	3.3
40	M	146	156	0.93	44	3.3
Mean (JUBR 41 excluded) =		156.3	169.9	0.92	50.7	3.0

*Kyphotic individual (JUBR 41).
F=female; M=male.

the hump inclines at an angle of nearly 30 degrees anteriorly and at about half as much posteriorly.

A perusal of the available literature reveals that Gressitt (1937) was the first to record kyphosis in turtles, and that of the seven cases of kyphosis and carapaceal deformity known so far, six pertain to the genus Trionyx (Family: Trionychidae) and only one to Pseudemys (Family: Testudinidae). While there is some doubt whether the testudinid instance is a case of real kyphosis or not, there is none whatsoever about the condition in the trionychid instances.

Among the recorded kyphotic individuals in Trionyx, two are Asian (Trionyx sinensis and T. steindachneri) and the remaining (T. ferox, T. spiniferus, T. muticus, and an unidentified species) are American. The present report is, thus, the third for Asia, first for India, and seventh case for any trionychid. In spite of this seemingly recurrent appearance of kyphosis in the members of the family trionychidae, it cannot be regarded as a peculiarity only to the members of this family, albeit similar instances in other families of turtles are extremely rare (only 12% as per records). It is seemingly a structural change, not a mutation, that appears as a result of some factor to which the members of the family Trionychidae may be more often subjected, irrespective of the species.

While the cause for kyphosis in turtles remains unknown, Williams (1957) hypothesized that late retraction of the yolk and/or excessively large yolk mass retraction may be the causal factor. Further documentation may confirm this proposal, but an apparently more reasonable hypothesis is that of Smith (1947), wherein the costal plates are believed to ankylose distally with the ribs early enough in embryonic life so that any differential in the growth rate between them and the vertebral column is translated into abnormal conditions of the body.

The absence of records of kyphosis in other families of turtles (save for the solitary report of Cagle, 1954), suggests that either (i) a total prenatal mortality accompanies any tendency towards kyphosis in other families, or (ii) other turtles are extremely resistant to the influence of any causal factor responsible for kyphosis in Lissemys or Trionyx.

Moreover, the tendency of only Lissemys and Trionyx to become kyphotic and survive to some length of time even after affliction, may further indicate that, of the various soft-shelled turtles, these two genera may not be genetically as distant as they are commonly regarded.



Fig. 1. A normal individual of Lissemys punctata punctata showing a comparatively depressed shell which is longer than broad (X 2/5).



Fig. 2. Frontal view of the kyphotic individual of L. punctata punctata. The hump shows a mild median and two prominent costal bulgings (X 1/2).



Fig. 3. Lateral view of the abnormal individual to show the gradient of the hump in the anterior and the posterior half (X 1/2).

Table 1 shows the disparity of the proportions of the normal individuals with the abnormal one (Fig. 3), presumably due to kyphosis. Data available at present are insufficient to surmise whether kyphosis is sex limited or not.

ACKNOWLEDGMENTS

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Regional Society News

FIRST RHSC A HUGE SUCCESS

Regional herpetological societies from throughout the United Stats had their first joint meeting on 8 August 1977 at The University of Kansas in Lawrence, under the sponsorship of the Kansas Herpetological Society and the Society for the Study of Amphibians and Reptiles (SSAR). SSAR Co-moderators James B. Murphy and Kraig Adler stated that the intent of the meeting was to stimulate communication among these many societies so they may benefit from each other. Kraig Adler introduced special guest Edward H. Taylor, Professor Emeritus of The University of Kansas, who has profoundly influenced herpetology for more than 60 years. SSAR Conference Coordinator Joseph T. Collins explained that development and growth of regional societies in North America is absolutely phenomenal, unmatched anywhere in the world. Presently there are about 50 state and metropolitan herpetological societies, made up primarily of many individuals who have serious, long-term interest in the biology of amphibians and reptiles. A government survey had shown that there are ca. one million herp hobbyists. Thus, it is appropriate for the SSAR to host this First Regional Herpetological Societies Conference (RHSC) because the SSAR began as the regional Ohio Herpetological Society, and therefore has a strong affiliation with regional societies.

The purpose of the RHSC was to enumerate and discuss the problems regional societies encounter, and share information that may lead to solving these problems. With cooperation each society can do more for its members as well as reptiles and amphibians. Invited speakers gave presentations of 5-10 minutes each, followed by discussion.

Kraig Adler, moderating the first session entitled MECHANICS OF RUNNING A REGIONAL SOCIETY, introduced the first speaker, Wayne Seifert (Texas Herpetological Society and Dallas Herpetological Society) speaking about Problems in Forming and Running a Regional Society. Seifert felt there must be communication among the officers to efficiently run a society. A

monthly newsletter can be helpful, information should be sent to the editor, but usually the editor must actively solicit such information, which can be a very time-consuming endeavor. Meetings, regardless of how often they are held, must be regular, and should always meet at the same location to avoid confusion. The officers should meet more often than at scheduled meetings. Determining how much money a society needs comes after determining its goals--try to accumulate a small hedge of excess funds. Do everything first class: a nice newsletter, classy stationery, good refreshments, etc. Avoid allowing one person to do too much by spreading out the duties. Otherwise the society will encounter stress when that person leaves. Procure new membership via newspaper advertising and word of mouth. If the society is good, word gets around. Get tax exempt non-profit organization status to save money in postage, taxes, and to stimulate tax deductable gifts.

Stanley Dyrkacz (Chicago Herpetological Society) speaking on Publications: Newsletters or Scientific Bulletins?, stressed deciding whether or not a publication is needed, and what kind. Newsletters are easier and cheaper to produce than a bulletin. A newsletter can include all kinds of items. A bulletin or journal may be worthwhile if the money is available, but avoid trying to do too much. Be sure that a publication is informative, neat, and professional. A publication represents the society. A bulletin can include natural history data, information on care of animals in captivity, etc. An advantage to publishing in a regional society journal versus a professional journal is that a note or article is published much more quickly with fewer problems. With a good bulletin that is cited in SSAR's Herpetological Review Current Titles Listing, Biological Abstracts and Zoological Record, a society can attract many more good manuscripts, and in turn acquire new corresponding members. But the publications must come out on time and regularly, otherwise members may not renew their subscriptions. Exchange bulletins or newsletters with other societies to disseminate information. Be sure to make these publications available at meetings. Copyright a publication. It only costs $6.00 and makes it look much better. If you need ideas for a good format, copy a well established journal. Support some of the publication cost with classified advertisements. Editors can try to get manuscripts by writing to people who have published previously in their journal and in others. Contact professionals at museums, zoos, and universities. Another technique for getting publishable material is to require meeting speakers to write an abstract of their presentation and publish it. Carefully choose an editor and be sure (s)he does a good job.



Participants in the First SSAR Regional Herpetological Society Conference held at the Museum of Natural History, University of Kansas, Lawrence, on 8 August 1977. From left to right-- First Row: Ray E. Ashton (FlaHS), William Love (FlaHS), Kelly Irwin (KsHS), John Applegarth (New MexHS), Janice Perry (KsHS), Stanley Dyrkacz (ChicagoHS), Tom Vermersch (TexHS), Eugene Rankin (St. LouisHS). Second Row: Herbert S. Harris (MdHS), Malvin Skaroff (PhilaHS & ESHL), Tom R. Johnson (SSAR & St. LouisHS), Eric Rundquist (KsHS), Michael Morton (OklaHS), Robert Bollinger (OklaHS), Randolph Krohmer (St. LouisHS), Scott Wheeler. Third Row: Kraig Adler (SSAR Conference co-moderator), Robert F. Clarke (KsHS president-host regional society), Steve Garber (ConnHS), Veralynne Bosko (NOAH), Delfi Messinger (KsHS), Marjorie Perry (KsHS), Frank Slavens (Pacific NWHS), Carol Brubaker (DallasHS), Wayne Seifert (TexHS & DallasHS), Charles Radcliffe (ColoHS). Fourth Row: Stan Roth (KsHS), Greg Mengden (TexHS), James B. Murphy (SSAR Conference co-moderator), John Groves (MdHS), George Pisani (SSAR & KsHS), Martin J. Rosenberg (NOAH), Judy Black (OklaHS), David Barker (DallasHS), Hugh Quinn (TexHS). Fifth Row: James L. Knight (KsHS), Shelly Skie (KsHS), Larry Miller (KsHS), Joseph Laszlo (TexHS), John Murphy (Chicago HS), Mike Dloogatch (ChicagoHS), Jeffrey Black (OklaHS). Sixth Row: John Zegel (GaHS), Robert Clark (KsHS), Frank Godwin (GaHS), J. T. Collins (SSAR Conference co-ordinator), Max A. Nickerson (SSAR & WiscHS), James Glenn (UtahHL), Peter Black (OklaHS), Andrew Black (OklaHS).

Tom R. Johnson (St. Louis Herpetological Society and SSAR) spoke about Conservation and Education Programs for Regional Societies. It was his feeling that a society cannot have successful conservation projects without educating the public, and education would not be meaningful without stressing the need for conservation. Besides working with the public it is important to keep state and federal authorities informed of conservation goals, keeping in mind that facts are much more valuable than emotion. Wait until information is ready before presenting it. Useful projects for a society might be to publish and make available a checklist of the amphibians and reptiles in your state or metropolitan area, write a booklet about the care of captive herps, or develop talks for schools and clubs. Exhibit animals at places like shopping centers. Donate money to organizations to buy and protect land. Work with the Audubon Society, Sierra Club, and other groups for a common cause, rather than spreading efforts thinly. In such a way it is possible to influence legislation favorably. If a regional society is especially ambitious, it may be possible to produce education-conservation movies.

Marjorie Perry (Kansas Herpetological Society) addressed the RHSC on How to Increase Income. She emphasized having dues that cover general expenses plus a small reserve. You can stimulate contributions through gift memberships, and IRS tax deductable donations if you are a non-profit organization. Sources of additional revenue can be obtained from special projects such as the production of publications printed and distributed in conjunction with other societies such as the SSAR. Sell back issues of your own publication. Budget very carefully, and keep societal money in interest-bearing accounts. Making money at auctions which use live animals is incompatible with conservation goals of many societies.

James B. Murphy moderated the second session entitled CONSERVATION AND CARE OF CAPTIVE ANIMALS, and introduced David G. Barker (Dallas Herpetological Society) who spoke on Live Collecting and Impact on Critical Habitats. Barker's major points were the need for more information about critical habitats,

and the need to learn more about captive maintenance and reproduction of amphibians and reptiles.

Jeffrey H. Black (Oklahoma Herpetological Society) addressed Promotion of Conservation for Herp Fanciers. He discussed the need to stress conservation of herps in order to educate the members of a society. Field trips are helpful in getting people out and showing them what is meant by conservation. Spots on T.V. and radio reach many people. Posters and live animal displays attract many people, and these plus answering questions and making available literature and posters can get across conservation ideals. Pamphlets or larger undertakings about herps in their natural habitat and how to care for them in captivity should be considered. Distribute these to pet shops where they can be given to buyers of reptiles gratis, so they may properly care for their animals. Let people know they should avoid unnecessary collecting.

James L. Glenn (Utah Herpetologist's League) talked about Problems on Maintenance of Captives (Snakebite, and Disease). He emphasized the need to inform society members of available publications on reptile disease and snakebite, and to inform members and petshops on how animals should be kept in captivity.

Malvin Skaroff (Philadelphia Herpetological Society and Eastern Seaboard Herpetologist's League) spoke on Cooperation Among Regional Societies. Skaroff explained that the ESHL is a loose federation of eleven regional societies from Massachusetts to Florida. Each regional society gives monetary support on a voluntary basis. The group sponsors two semi-annual meetings with one of the constituent societies acting as host. One of ESHL's main purposes is the exchange of information via their newsletter, which is sent to representatives of each group, as well as to the SSAR Liaison Committee and various interested herpetologists. Input to the newsletter comes from society bulletins and newsletters (which are also sent to other societies) as well as personal communications to the editor and coordinator, and includes such information as news of people, programs, collection records and legislative proposals.

Ray Ashton, Jr. (Florida Herpetological Society) addressed the topic of Cooperation for Purposes of Public Education. Regional societies should cooperate with local, regional, or state education or governmental agencies in doing such things as: 1) setting up educational workshops for state fish and game officials, park naturalists, 2) assisting school district environmental education programs, 3) setting up traveling programs to visit camps and parks, 4) cooperating with agencies producing herp publications in fish and game magazines for state parks, etc. He stressed cooperation with environmental groups by producing quality information for their newsletters and magazines. Regional societies can select excellent speakers from among their ranks to present programs to such groups. Cooperate with these groups on environmental projects, because often herps are ignored due to lack of information input. Regional societies should provide formal comments on environmental impact statements, and must band together and remain informed and prepared to comment on important environmental topics which involve amphibians and reptiles. All this can be accomplished by each society developing an educational committee or finding a person to head their public education. Regional societies should avoid being just animal oriented and should equally emphasize people orientation.

Herbert S. Harris (Maryland Herpetological Society) lectured on the Establishment of National League of Regional Societies or a National Clearing House. He proposed that all regional societies have a parent group, the Regional League, which in turn would come under a National League. It would be the National League's responsibility to publish a quality scientific journal, while the Regional League and individual societies would publish their bulletins and/or newsletters concentrating on local needs. He felt a national publication would be useful because many of the papers published in the regional journals are of interest to scientists, but with the myriad of regional journals it is too costly to subscribe to them all.

James B. Murphy (SSAR) spoke last and addressed Cooperation Between Regional Societies and the SSAR: Present and Potential Benefits Through Societal Cooperation. He said the SSAR Regional Society Liaison Committee discontinued trying to set up a nationwide speaker bureau because after posting a notice in Herp Review it received very few responses. He stated that the SSAR is pleased that each year there are more zoo professionals joining the society and attending its meetings. He also informed everyone that Tom Johnson receives regional society material and prepares it for inclusion in Herp Review where pages are allotted specifically for information concerning regional societies.

In summary, the SSAR's First Regional Herpetological Society Conference was a huge success. Many excellent talks were given by the regional society representatives, and plenty of time was available, both during breaks and over dinner, to exchange ideas and get to know persons from other societies across the country. In particular, the SSAR thanks Rose Etta Kurtz for her diligent assistance in organizing the conference, and Philip S. Humphrey, Director of the Museum of Natural History, University of Kansas, for graciously permitting us the use of the Museum's facilities.

The assembled representatives endorsed the idea of the SSAR sponsoring the Second Regional Herpetological Society Conference, to be held in conjunction with the 21st annual meeting of the SSAR in 1978 at Arizona State University in Tempe. This meeting will be held near or over the Memorial Day weekend. Joseph T. Collins volunteered to again act as the conference coordinator, and will contact each regional society soon.

STEVEN D. GARBER, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045 (formerly representing the Connecticut Herpetological Society). ●

FRENCH HERPETOLOGICAL SOCIETY

The French Herpetological Society is active since 1970. Membership includes both Professional and Amateur Herpetologists and amounts to approximately 500 members now. A quarterly international newsletter is published and local and general meetings are held each year in connection with other European Herpetological Societies.

Current projects include accurate mapping of all French species and emphasis is put on protection of endangered species in France and overseas. For further information write to: Dr. J. Castanet, Societe Herpetologique de France, Laboratoire d'anatomie comparee, 2 Place Jessieu, 75005 Paris, France. The yearly dues for membership are $10.00. FOREIGN MEMBERSHIP WELCOME. ●

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KERATOPHAGY IN THE SLENDER VINE SNAKE, UROMACER OXYRHYNCHUS

Keratophagy, the eating of shed epidermal material, has previously been reported for several species of snakes (Mattlin, 1946; Groves, 1964; Groves and Groves, 1972). Although this behavior in snakes has been suggested to be related to reptile-eating and/or cannibalistic habits, it appears to be more accidental in occurence than a well developed habit (Groves and Groves, 1972). Reported here is an additional case of keratophagy in a colubrid snake, which supports this latter view.

An adult pair of slender vine snakes, Uromacer oxyrhynchus have been kept together on exhibit at the Philadelphia Zoological Garden for 14 years. These snakes are fed exclusively Anolis carolinensis, which are present in the exhibit at all times. During the night of 25 March 1977, the male shed its skin. The next morning, before the exhibit was cleaned, this snake was observed ingesting part of this skin, beginning approximately 25 cm from the tail, breaking off this piece, and then ingesting it in its entirety, a process which required about 20 minutes. The circumstances which elicited this behavior were not observed.

In June 1976, Bruce Mayer, a keeper in the Reptile House, reported that the female in this exhibit struck at a paper towel while he was cleaning the glass of their exhibit and ingested a piece of it. The stools of this snake were examined and the missing piece of paper towel was found intact about one week later. Our observations on the feeding behavior of this species indicate that they are attracted to prey primarily by movement, since inactive and dead anoles are frequently overlooked even when these snakes are actively searching for food. It is therefore possible that these snakes were first attracted to the paper towel and the shed skin as a result of the movement. In the latter case, it is possible that an anole or even the snake itself could have moved the skin and the snake could have mistaken this movement for the movement of potential prey. The initial seizing of the paper towel and the ingesting of both the piece of paper towel and the shed skin were certainly deliberate.

Although all of the snakes that have been reported to eat shed epidermal material, with the possible exception of Boiga blandingi, are predominantely reptile-eating species, there appears to be no evidence that this behavior occurs frequently and has any significance in their survival. The fact that shed skins are regularly removed from the cages of Uromacer and the observations concerning the ingestion of inorganic matter by one of these snakes, support the view of Groves and Groves (1972) that keratophagic habits in snakes are nothing more than a mere quirk, possibly influenced by reptile-eating tendencies.

We would like to thank Bruce Mayer and Joseph Meenan for their comments on the behavior of these snakes at the Philadelphia Zoological Garden. We would also like to thank Kevin Bowler, Harry Greene, and Frank Groves for their aid in the preparation of this manuscript.

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A PROPAGATION PROGRAM FOR CHINESE ALLIGATORS (ALLIGATOR SINENSIS) IN CAPTIVITY



Available information on the wild status of Alligator sinensis is scarce (Honegger, 1968). In the past, the species occurred throughout most of Eastern China. Currently, it is reported in the vicinity of Wuhu in Anhwei Province, Changhsing in Chekiang, and along a small section of the lower reaches of the Yangtze River (Wang Yang, 1962). The present restricted distribution is thought to have resulted from a combination of man-caused habitat alteration and heavy hunting pressure. Although the Chinese alligator is totally protected in the People's Republic of China (A.F. Oeming, in lit.), we can presume that human population pressure will further limit its distribution.

Duplaix-Hall (1975) reports that a total of 59 specimens (11.10.38) are maintained in 38 zoological park collections worldwide. Only six specimens (2.4) are living in zoological collections in the United States. Until recently, these specimens were scattered among five institutions.

After many years of unsuccessful attempts at breeding its pair of Chinese alligators in its Reptile House, the New York Zoological Society searched for a quasi-natural site at which to develop a propagation program. Additional specimens were sought from other zoological parks to include in the project.

The Rockefeller Wildlife Refuge, owned and operated by the Louisiana Wildlife and Fisheries Commission, and located in the coastal marshes of southwestern Louisiana, offers suitable conditions. Comparison of meterological data from the two localities indicates roughly similar temperatures, amounts of precipitation, and seasonal changes. The staff of the Refuge contains some of the most knowledgeable and experienced biologists now studying the ecology, behavior, and reproductive biology of the American alligator (A. mississippiensis). Their programs include the propagation of that species in captivity. Their knowledge and experience is a valuable asset to the A. sinensis propagation effort. The New York Zoological Society submitted a proposal for a joint propagation program to the Louisiana Wildlife and Fisheries Commission. It was approved in late November 1975 and construction of facilities at the Refuge began immediately under the direction of Ted Joanen, Research Leader, Refuge Division. The U.S. National Zoological Park joined the

project by contributing the only other available pair of Chinese alligators in the United States.

On 22 March 1976, the four A. sinensis were transferred from the New York Zoological Park to their quarters at the Rockefeller Wildlife Refuge. Currently, each pair is located in a double-fenced, escape-proof, one-half acre enclosure. Each enclosure contains natural vegetation, two freshwater 400 square foot ponds, and one 1875 square foot (25' x 75') pond. All ponds are graded to a maximum depth of 5 feet. Maintenance of the four specimens will parallel that developed for American alligators currently being bred at the Refuge.

The specimens that are being used in the initial phase of the program are long-term captives. The U.S. National Zoo pair has been in captivity for at least 37 years and the NYZS pair for 19 years. Hopefully, the pairs are still capable of reproduction. Courtship by the NYZS pair has been observed regularly each year, but they have failed to nest. Similar behavior has been demonstrated by the NZP pair. If geriatric problems occur, additional specimens will be sought.

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Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Conant (1956, 1975) or Stebbins (1966). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916. Short manuscripts are acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

RANGE EXTENSIONS AND NEW COUNTY RECORDS OF SOME ILLINOIS AMPHIBIANS AND REPTILES

The specimens cited below are in the collection of Harlan D. Walley (HDW), and supplement those Illinois records of Smith (1961, Amphibians and Reptiles of Illinois Nat. Hist. Survey Bull. 28(1): 1-298).

Notophthalmus viridescens louisianensis (Central Newt). DeKalb Co: Audubon Sanctuary Pond. 16 km N DeKalb 15 Feb. 1969-20 March 1969. HDW 725-729. Constitutes a relictual population, and fills the hiatus between the DuPage County record on the east and Lee County on the west. Emydoidea blandingi (Blanding's Turtle). DeKalb Co: 3.2 km W Sandwich, marsh bordering Somonauk Creek. Two specimens observed but not collected 29 April 1972. LaSalle Co: 4.8 km N Sheridan. June 1972. 3.2 km N Utica, Triumph Rd. HDW 1360. Utica record extends range approx. 96.0 km SW Kane County record and 84.8 km NE of Peoria record. Chrysemys scripta elegans (Red-eared Turtle). DeKalb Co: 3.2 km W Sandwich, marsh bordering Somonauk Creek. 29 April 1972. HDW 1219. Extends range 68.6 km NE, 86.4 km E, and 68.8 km W of nearest records. Lake Co: Fox Lake, Pistakee Lake. 14 Sept. 1974. Extends range 9.6 km N of previous Illinois records. Heterodon platyrhinos (Eastern Hog-nose snake). Knox Co: Maquon. 7 Sept. 1970. HDW 1100. Grundy Co: Coal City. 12 July 1974. HDW 1359. Opheodrys vernalis blanchardi (Western Smooth Green Snake). DeKalb Co: 9.6 km S DeKalb, under railroad ties bordering tracks. 15 Sept. 1972. HDW 1233, and five eggs, hatched same day, HDW 1229-1231. Extends range 57.6 km NW, 75.2 km NE and 38.4 km S of previously known localities.

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THE PRESENCE OF THE SCARLET KINGSNAKE, LAMPROPELTIS TRIANGULUM ELAPSOIDES HOLBROOK (REPTILIA, SERPENTES, COLUBRIDAE), IN THE FLORIDA KEYS

For the past 48 years, the presence of Lampropeltis triangulum in the Florida keys has rested upon one specimen (UMMZ 67741) collected on Key West before or during 1929. Duellman and Schwartz (1958:304) considered this record "doubtful" because, "despite intensive collecting" in the keys, no additional specimens were available. In a more recent listing of snakes inhabiting the Florida keys, Paulson (1966) omitted L. triangulum completely. Williams (1970) examined the specimen and included Key West on his distribution map but listed it as Dade rather than Monroe County. Conant (1975) is the most recent authority to include Key West in the distribution of the species.

On the evening of 29 November 1976, Brian Sharp and I collected an adult male L.t. elapsoides (USNM 204238) 21.3 km NE of Key Largo on Largo Key, Monroe Co., Florida. This locality lies within a Black Ironwood (Krugiodendron fereum) dominated tropical hardwood hammock with a substrate of coral-limestone and scattered loose rock.

Williams (1970) illustrates variation in ventral counts for L. triangulum in which a cline is demonstrated along the Atlantic coast. Ventral counts decrease in a southward direction from New Jersey to Florida with a mean of 170.7 (N=22) in south Florida males. USNM 204238 from Largo Key exhibits a very low ventral count (157) and probably represents the terminus of that cline. The relatively high number of ventrals (176) on UMMZ 67741 from key West tends to relate it to populations farther north. Coluber constrictor (Auffenberg, 1955) and Storeria dekayi (Paulson, 1966) occuring on the lower keys have also been shown to exhibit affinities closer to northern populations than to the less-distant southern mainland. Paulson (1966) discussed the possible significance of this character displacement.

Although the Key West specimen is probably valid, it is doubtful whether L. triangulum still occurs on the heavily developed island. It is possible that this small, secretive, and largely noctural snake has been overlooked on other keys by collectors. Keys which support extensive pineland and/or hammock vegetation, may provide sufficient habitat for the species.

In light of the above evidence, Lampropeltis triangulum should now

be included in all faunal lists of the upper Florida keys.

Acknowledgments

I thank Brian Sharp for valuable field assistance, George R. Zug of the Division of Reptiles, National Museum of Natural History, for the use of facilities, and especially Stephen D. Busack, National Fish and Wildlife Lab, for general assistance. The UMMZ specimen was made available to Busack through R.A. Nussbaum and data were supplied through the efforts of P.E. Feaver.

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DISTRIBUTIONAL MAPS OF REPTILES OF IRAN

Map I: Sauria
Map II: Ophidia, Chelonia, Crocodilia

Two distributional maps of Iranian reptiles were prepared using our collections and the literature. Our studies were conducted in 1974 and 1975 throughout Iran. The purposes of these geographic distribution maps are:

1) To enumerate taxa collected during our survey, to subspecies if possible. Unidentified species are included by genera.

2) To serve as a basis for examining the isolation of races, both as a foundation for further recording of the Iranian herpetofauna and as an aid for the field herpetologist to facilitate identification.

Only records of exact localities were used and many regions have not yet been researched herpetologically.

Unique symbols are used for each taxon. By variation of the significant fundamental symbols, the different taxa are linked hierarchically (for example, all Scincidae are listed by a square basic symbol, all members of the genus Eremias by a rhombus). A detailed index of literature refers to all sources used for this revision.

I would be thankful for receipt of other documented records to supplement those of this paper.

Footnote: Agama caucasica mucrohata has been regarded as a synonym of Agama erythrogastra in the sense of Clark, R.J. et al., 1966.

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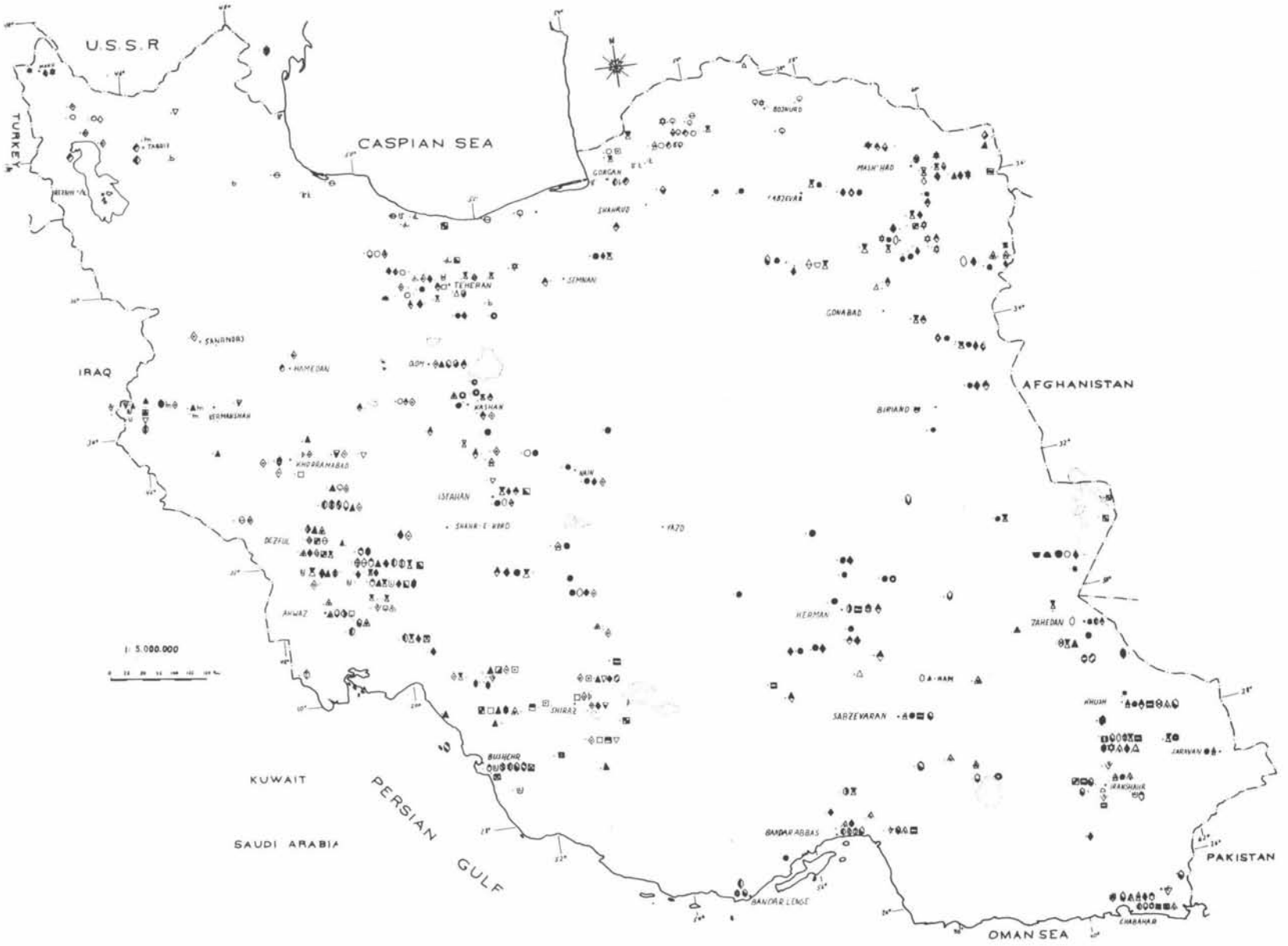
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The maps and legends are shown on the following pages.

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MAP I


U.S.S.R
TURKEY
CASPIAN SEA
IRAQ
AFGHANISTAN
PAKISTAN
KUWAIT
SAUDI ARABIA
PERSIAN GULF
OMAN SEA
TEHERAN
ISFAHAN
SHIRAZ
BUSHEHR
BANDAR ABBAS
KERMAN
ZAHEDAN
MASH'HAD
GONABAD
BIRJAND
SABZEVARAN
1: 5.000.000

MAP II


U.S.S.R
TURKEY
CASPIAN SEA
IRAQ
AFGHANISTAN
KUWAIT
SAUDI ARABIA
PERSIAN GULF
OMAN SEA
PAKISTAN
TABRIZ
ORUMIYEH
MASHHAD
SABZEVAR
GORGAN
SHAHRUD
TEHERAN
SEMNAN
GONABAD
SANANDAJ
HAMEDAN
QOM
KERMANSHAH
BIRJAND
KHORRAMABAD
ISFAHAN
YAZD
DEZFUL
KERMAN
ZAHEDAN
SHIRAZ
BAM
KHUSH
SABZEVARAN
BUSHEHR
BANDAR ABBAS
BANDAR LENGE
1: 5.000.000

MAP I LEGEND



AGAMIDAE

Agama agilis asp.indet. Olivier
agilis agilis Olivier
agilis isolepis Boulenger
agilis sanguinolenta (Pallas)
Agama blanfordi (=persica) (Blanford)
Agama caucasica asp.indet. (Eichwald)
caucasica caucasica (Eichwald)
caucasica mucronata Guibe-
Agama erythrogaster Nikolsky
Agama microlepis (Blanford)
Agama nupta De Filippi
Agama ruderata asp.indet. Olivier
ruderata baluchiana Olivier
ruderata ruderata Olivier
Calotes versicolor (Daudin)
Phrynocephalus helioscopus (Pallas)
maculatus Anderson
mystaceus Pallas
scutellatus (Olivier)
Uromastix sp.indet. Merrem
asmussi (Strauch)
loricatus (Blanford)
microlepis Blanford

AMPHISBAENIDAE

Diplometopon zarudnyi Nikolsky

ANGUIDAE

Anguis fragilis colchicus Demidoff
Ophisaurus apodus (Pallas)

SCINCIDAE

Ablepharus brandtii De Filippi
Ablepharus pannonicus Lichtenstein
Chalcides ocellatus ocellatus (Forskål)
Eumeces schneideri variegatus Schmidt
Eumeces zarudnyi Nikolsky
Mabuya aurata Linnaeus
aurata affinis De Filippi
aurata septemtaeniata Reuss
Mabuya vittata Olivier
Ophiomorus blanfordii Boulenger
Ophiomorus brevipes (Blanford)
Ophiomorus chernovi Anderson&Leviton
Ophiomorus persicus (Steindachner)
Ophiomorus streeti Anderson&Leviton
Ophiomorus tridactylus (Blyth)
Scincus conirostris Blanford

VARANIDAE

Varanus griseus Daudin
Varanus bengalensis (Daudin)

GEKKONIDAE

Agamura cruralis Blanford
Agamura persica (Dumeril)
Alsophylax crassicauda Nikolsky
Bunopus biporus Werner
Bunopus tuberculatus Blanford
Ceramodactylus affinis Murray
Ceramodactylus doriae Blanford
Cyrtodactylus agamuroides (Nikolsky)
Cyrtodactylus caspius (Eichwald)
Cyrtodactylus fedtschenkoi (Strauch)
Cyrtodactylus heterocercus (Blanford)
Cyrtodactylus kirmanensis (Nikolsky)
Cyrtodactylus scaber (Heyden)
Eublepharis angramainyu Anderson&Leviton
Eublepharis macularius (Blyth)
Hemidactylus flaviviridis Rüppel
Hemidactylus persicus Anderson
Hemidactylus turcicus (Linnaeus)
Phyllodactylus elisae Werner
Pristurus rupestris Blanford
Pristurus rupestris iranicus Schmidt
Ptyodactylus hasselquisti (Donndorf)
Rhinogecko misonnei De Witte
Teratoscincus doriagai Nikolsky
Teratoscincus microlepis Nikolsky
Teratoscincus scincus scincus (Schlegel)
scincus keyserlingii Strauch
Tropiocolotes (=Microgecko) helenae Nikolsky
helenae fasciatus J.J.&J.F.Schmidtler
helenae helenae Nikolsky
Tropiocolotes latifi Levitон&Anderson
Tropiocolotes persicus bakhtiari Minton
persicus persicus Nikolsky
Tropiocolotes steudneri Peters

LACERTIDAE

Acanthodactylus cantoris blanfordi Boulenger
cantoris cantoris Günther
cantoris schmidti Haas
Acanthodactylus micropholis Blanford
Apathya cappadocica urmiana Lantz and Suchow
Eremias sp.indet.
Eremias velox (Pallas)
velox velox (Pallas)
velox persica Blanford
velox strauchii Kessler
Eremias arguta (Pallas)
Eremias brevirostris (Blanford)
Eremias guttulata watsonana Stoliczka
Eremias lineolata
Eremias nigrocellata Nikolsky
Eremias pleskei Bedriaga
Lacerta brandtii De Filippi
Lacerta chlorogaster Boulenger
Lacerta danfordii (Günther)
Lacerta princeps princeps Blanford
Lacerta saxicola defilippi (Camerano)
Lacerta strigata strigata Eichwald
Lacerta trilineata media Lantz and Cyren
Lacerta viridis strigata Eichwald
Ophisops elegans elegans Menetries
Elegans Blanfordii Schmidt

MAP II LEGEND

Boidae

Eryx jaculus (Linnaeus)
Eryx jaculus familiaris Eichwald
Eryx tartaricus tartaricus (Lichtenstein)

Colubridae

Boiga trigonata melanocephala (Annandale)
Coluber spez.indet.
Coluber andreana Werner
Coluber jugularis asianus (Boettger)
Coluber karelini Brandt
Coluber najadum (Eichwald)
Coluber rhodorachis Jan
Coluber ravergieri ravergieri Menetries
Coluber ventromaculatus Gray
Contia collaris Menetries
Contia fasciata Jan
Coronella austriaca Laurenti
Eirenis collaris (Menetries)
Eirenis iranica Schmidt
Eirenis persica (Anderson)
Eirenis punctatolineata (Boettger)
Elaphe caudaelineata Günther
Elaphe hohenackeri (Strauch)
Elaphe longissima Laurenti
Lytorhynchus gabriellis Werner
Lytorhynchus gaddi Nikolsky
Lytorhynchus maynardi Alcock u. Finn, J.Asiat
Lytorhynchus ridgewayi Boulenger
Malpolon monspessulanus insignitus (Geoffroy)
Natrix natrix (Linnaeus)
Natrix natrix persa (Pallas)
Natrix tesselata (Laurenti)
Psammophis lineolatus (Brandt)
Psammophis schokari (Forskål)
Spalerosophis diadema cliffordi (Schlegel)
Spalerosophis diadema diadema (Schlegel)
Spalerosophis microlepis (Jan)
Spalerosophis schirazianus (Jan)
Telescopus fallax iberus (Eichwald)
Telescopus tesselatus tesselatus (Wall)
Telescopus rhinopana (Blanford)

Elapidae

Microcephalophis gracilis gracilis (Shaw)
Pelamydrus platurus (linnaeus)
Praescutata viperina (Schmidt)
Walterinnesia aegyptia Lataste

Hydrophiidae

Enhydrina schistosa (Daudin)
Hydrophis cyanocinctus Daudin
Hydrophis spiralis (Shaw)

Leptotyphlopidae

Leptotyphlops hamulirostris (Nikolsky)
Leptotyphlops laticeps (Nikolsky)
Leptotyphlops macrorhynchus (Jan)

Typhlopidae

Typhlops vermicularis Merrem

Viperidae

Agkistrodon halys caucasica
Echis carinatus (Schneider)
Echis carinata pyramidum (Geoffrey)
Pseudocerastes latirostris Guibé
Pseudocerastes persicus (Dumeril and Bibron)
Vipera latifi Mertens&Darevsky&Klemmer
Vipera lebetina (Linnaeus)
Vipera lebetina obtusa Dwigubsky
Vipera ursini ebneri

Testudinidae

Testudo graeca Linnaeus
Testudo graeca ibera Pallas
Testudo horsfieldi Gray
Testudo zarudnyi Nikolsky

Emydidae

Emys orbicularis (Linnaeus)
Mauremys caspica caspica (Gmelin)

Trionychidae

Trionyx euphraticus (Daudin)

Crocodylidae

Crocodylus palustris palustris Lesson

Conservation

PROJECTO VENEZOLANO SOBRE COCODRILOS (VENEZUELAN CROCODILE PROJECT)

Hoy en dia existe en Venezuela un lugar destinado a servir como centro de investigacion y demonstracion de la Naturaleza: es el Parque Loefling (Puerto Ordaz), el cual se utilizara como sitio donde se efectuara un proceso educativo sobre la interpretacion de la naturaleza y los ciclos biologicos que en ella se cumplen. Uno de los intereses fundamentales de este parque es fomentar trabajos cientificos dirigidos e estudiantes de educacion media. Diez hectareas en estado semivirgen se han comprometido para esta experiencia, donde se encuentran algunos animales autoctonos de la region, representativos de la fauna Guayanesa y sus alrededores. Entre dichos animales esta Crocodylus intermedius, llamado en nuestro medio "Caiman del Orinoco," que fue victima del rios. La historia de los ejemplares que se tienen en el Parque Loefling es la siguiente: Por los anos 1959-1960, fueron recogidos en el Delta del Orinoco 4 cocodrilos (2 hembras y 2 machos) que se trasladaron a un sitio llamado Macagua, cercano a Cuidad Guayana, y mas tarde a una laguna ubicada en el Parque Chachamay. Durante varios anos las crias se perdian. En el ano 1974 las 2 hembras dieron un total de 56 crias. En el mismo ano se escapo uno de los machos progenitores. De los recien nacidos que fueron transladados al Parque Loefling se escaparon 31 y murieron 7 quedondo tan solo 18. Luego murio el otro macho progenitor pero despues de haber prenado a un cocodrilo hambra. Las crias resultantes se recogieron en abril de 1976. De 8 retonos murieron dos. En el presente contamos con 2 hembras progenitoras, 18 individuos de la primera cria (en los que no se ha determinado el sexo) y 5 machos y 1 hembra de la segundra cria, lo cual totaliza 26 ejemplares. Se ha observado que el desove ocurre en el mes de febrero y necesitan arena para que esto ocurra. Actualmente se alimentan a base de carne (bofe) una vez a la semana.

Para el proximo and se lanea A expandir las facilidades para N habilitar una procion destinada a la reproduccion y cria de los ejemplares disponibles, que eventualamente se utilizaran para repoblar las areas donde los cocodrilos antes fueron comunes.





The Parque Loefling (Puerto Ordaz, Venezuela) is being developed as a center for investigation and wildlife demonstration. An educational program is being developed in order to teach an understanding of wildlife and ecological principles. A fundamental interest at the park is to direct scientific studies carried out by high school students. Ten hectares of the park are in a semi-virgin state and will be used for educational purposes. In this area have been released representatives of the fauna of the Venezuelan Guayana and the surrounding areas. Among these animals are Crocodylus intermedius, called in this area "Caiman del Orinoco", a species which was the victum of extermination in recent years and is now seldom found in our rivers. The history of these crocodiles is as follows: In the years 1959-1960 four crocodiles (two males and two females) were collected in the Orinoco Delta, and were taken to a nearby site called Macagua. They were later transferred to a lagoon in the Parque Cachamay (which includes the new Parque Loefling). For some years the broods were lost. In 1974 the two females produced a total of 56 young. The same year one of the adult males escaped. Of the hatchlings that were transferred to the Parque Loefling 31 escaped and 7 died leaving only 18. Later the other adult male died after impregnating one of the females. The resultant brood was collected in April 1976, and of 8 hatchlings, two died. The current population consists of two adult females, 18 young from the first brood (whose sex we have not determined) and five males and one female from the second brood, a total of 26 individuals. Egg laying has been observed to occur in February and the eggs are laid in sand. The animals are fed on bovine lung once a week.

Next year it is planned to expand the facilities in order to make a sector specifically for the reproduction and raising of available crocodiles. The excess specimens will eventually be used to repopulate areas where these crocodiles used to be common.

YOLANDA RAMIREZ and CARMEN CECILIA CASTILLO, Div. Desarollo Humano, Edificio CVG-EDELCA, Apartados 292-301, Ciudad Guayana, Estado Bolivar, Venezuela; and S. J. GORZULA, Dep. Med. Exp., I.V.I.C., Apartado 1827, Caracas 101, Venezuela.

LEGISLATION

Rulemaking actions:

In a final rulemaking issued by the Fish and Wildlife Service (21 July 1977), the giant anole (Anolis roosevelti) has been listed as Endangered and its limited range (mountain forest on the slopes of Mt. Ruaca-Culebra Island, Commonwealth of Puerto Rico) has been designated as Critical Habitat.

Threatened status has been proposed by the U.S. Fish and Wildlife Service for the eastern indigo snake (Drymarchon corais couperi) (1 August 1977). In recent years local populations of the eastern indigo have suffered a major

decline, principally because of commercial trade. The snake's large size and extremely docile nature make it highly desirable as a pet, and "prime" specimens may sell for as much as $250.00 each. The deadline for submitting relevant comments and criticisms regarding the proposed rulemaking to the Fish and Wildlife Service was 30 October 1977.

Other herp species whose status is, or recently has been, the subject of Fish and Wildlife rulemakings include: Ameiva polops, Cyclura, stejnegeri, Crotalus willardi obscurus, Epicrates monensis, Natrix fasciata taeniata, Typhlops monensis, Bufo houstonensis, B. lemur, B. nelsonii, Hyla anderson, Rana onca, Necturus lewisi, Eurycea nana, E. troglodytes, Plethodon larselli, P. stormi, Typhlomolge tridentifera, Chrysemys alabamensis, C. concinna suwanniensis, C. rubriventris, Graptemys caglei, G. flavimaculata, G. oculifera, G. pseudogeographica sabinensis, G. versa, G. nigrinoda, Kinosternon bauri bauri, K. flavescens spooneri, and Sternotherus depressus.

Additional notes: Representatives from the nations cooperating in the control of trade in endangered species held a special working session 17-28 October 1977 at Geneva, Switzerland. The discussions covered guidelines for the shipment of live specimens, identification of specimens, exchange of museum specimens, and the care and disposal of confiscated wildlife. There was also a review of certain species listed in Appendices I and II of the Convention on International Trade in Endangered Species. Recommendations were drawn up for action at the next full meeting of the treaty nations, scheduled for fall, 1978 in Costa Rica.

THOMAS J. BERGER, Museum of Natural History, The University of Kansas, Lawrence, Kansas 66045.

News Notes

HERPETOLOGICAL NEWS AT THE SMITHSONIAN

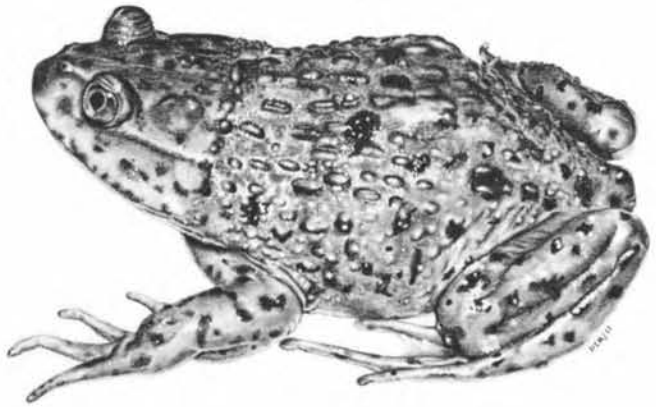
Effective 1 September 1977, George R. Zug became the Chairman of the Department of Vertebrate Zoology, National Museum of Natural History. The chairmanship is a five year term. Dolores Icarangal, the long-time secretary of the Division of Reptiles and Amphibians, has retired. The current staff of the Division consists of Ronald I. Crombie, Ron Heyer, Frances I. McCullough, and Dorsey Williams. Francis Blasdell is assigned to the Division as a cataloguer.

The Herpetology Section of the National Fish and Wildlife Laboratory of the Department of Interior has been reorganized. Bruce Bury transferrd to the laboratory in Fort Collins, Colorado in February 1977. The curatorial position at the Smithsonian is currently unfilled. Steve Busack is the only NFWL staff member currently assigned to divisional duties.

Our sound analysis laboratory is now completed. The basic components of the system are a Kay Sonagraph, a B and K frequency analyzer, and a Hewlett-Packard oscilloscope and strip chart recorder. The system was designed by George Drewry and Ian Straughan and assembled by George Drewry. Anyone interested in using the equipment or having analyses done should contact Heyer. Current understaffing may prevent extensive service to the herpetological community, although contract employees are available for anyone having funds.

Ian Straughan has deposited all data associated with his dissertation on the systematics and species isolating mechanisms of Queensland, Australian frogs in the Division. The materials include tape recordings of Queensland frogs, records of the specimens examined in museums for the dissertation and specimens examined in North American museums after the dissertation was completed. Ian does not plan to publish the systematic portion of his dissertation, but wishes to make the material available to interested workers.

The Smithsonian Herpetological Information Services (SHIS) series continues to be produced and distributed by the Division. Fran McCullough has assumed the editorship of this series; any inquiries concerning the series should be directed to her.



Richard James Holub
(1945-1977)

On 23 August 1977, Richard James Holub died instantly from injuries sustained in an automobile accident in Vernon, New Jersey. Mr. Holub was 32 years old. Best known among amateur and professional herpetologists for his meticulous and thorough studies with Clemmys muhlenbergi, Richard Holub was, by profession, a land surveyor with High Point Engineers in Vernon, New Jersey.

Although never published, Richard's work with the Bog Turtle was well known and much respected. His opinions and knowledge of the species, resulting always from first hand observations, were often sought after by turtle fanciers, professional herpetologists and conservationists alike. He was one of the first people to successfully breed and raise Bog Turtles in captivity and he successfully maintained an outdoor captive breeding colony for a number of years on the farm where he lived in Sussex County, New Jersey.

With an avid interest in herptiles even as a boy in Ridgewood, New Jersey, Mr. Holub continued this interest and broadened it to include all wildlife in his later years. With his wife Susan and their little boy, Michael, Richard was a familiar sight in the fields and woodlands of northern New Jersey during herptile society field trips.

A wildlife photographer and artist in his spare time, Richard was a dedicated conservationist who looked to the day when mankind would learn to share the world with wildlife, respecting animals' right to live out their lives undisturbed. He not only expresed these beliefs, if asked his opinion, but through his actions, truly practiced his beliefs.

One of the initial members of The Muhlenberg Group, Mr. Holub was, at the time of his death, Vice President of the Association for the Conservation of Turtles and Tortoises Inc.

He is survived by his wife Susan and his 7 year old son, Michael. ●

SSAR PRIZE FOR BEST STUDENT JOURNAL PAPER

The Society for the Study of Amphibians and Reptiles awards an annual prize of $100 for the most significant student paper published in each volume of the Journal of Herpetology. Papers must be submitted to the Editor for publication within one year of the author's having been a student at an accredited school (elementary, secondary or university level). Unlike awards for oral presentations, which require the presence of the person at a particular meeting site in order to compete, this prize is open to students throughout the world. Papers are judged by a committee of five persons, international in composition. The Editor must be notified of the student status of the author when the paper is accepted for publication. The award is presented at the Society's Annual Meeting, and it is hoped that each year recipients will be present to accept the award.

The SSAR student prize for the most significant paper published in 1976 appeared in Volume 10 Number 4, pp. 293-298, of the SSAR Journal of Herpetology. The paper, entitled "Prey availability, consumption and selection in the cricket frog, Acris crepitans (Amphibia, Anura, Hylidae)" was written by George M. Labanick, a graduate student in the Department of Zoology, Southern Illinois University, Carbondale. Mr. Labanick's research for the paper was done toward obtaining a Master's thesis, and was conducted under the direction of Dr. John Whitaker.

THE THEODORE ROOSEVELT MEMORIAL FUND

The Theodore Roosevelt Memorial Fund provides financial assistance to individuals (especially graduate students and persons with recent graduate degrees) conducting research in North America in any phase of wildlife conservation or natural history related to the activities of the American Museum of Natural History. Grants are usually kept to small sums of not more than several hundred dollars. Most awards support field work, and funds are not made available for salaries or for the purchase of non-expendable equipment. Address requests for application forms and all correspondence to: Theodore Roosevelt Memorial Fund, The American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024. Deadline for applications is 15 February.

HR EDITORS AND STAFF ARE GRATEFUL

With this last issue of Volume 8, the editors and staff of Herpetological Review wish to express their sincere appreciation to the many individuals whose efforts have made production of this periodical so much easier.



For refereeing articles we thank: Kevin Bowler, Charles C. Carpenter, Henry Fitch, Neil Ford, Richard Franz, Tom R. Johnson, James D. Lazell, Jr., Joseph C. Mitchell, Richard R. Montanucci, James B. Murphy, Jaime Pefaur and Hobart M. Smith.

Special thanks are due Tom R. Johnson, W.F. Nelson, Pat Latas, and Richard Lattis for the fine line drawings they have made available to us. Janice Perry, Eric M. Rundquist and Rose Etta Kurtz have assisted the editors by helping with the innumerable tasks associated with production.

Finally, we thank Philip S. Humphrey, William E. Duellman, Frank B. Cross, E. O. Wiley, all of the Museum of Natural History at the University of Kansas, and Stephen R. Edwards, Association of Systematics Collections, for their logistical support and use of facilities without which Herpetological Review could not be produced.



Bullfrog on a lily pad at Oklahoma City Zoo. Photograph by Jeffrey H. Black.

COLLINS ON LEAVE DURING 1978

J.T. Collins, Co-Editor of HR and SSAR Chairman-elect during 1977, will be on leave from his HR co-editorship during calendar year 1978 since he will be SSAR Chairman that year. Collins will resume co-editorship of HR for calendar 1979. During 1978, all manuscripts, news notes, errata, etc., should be directed to: George R. Pisani, Department of Biology, University of Kansas, Lawrence, Kansas 66045.

The HR co-editors are pleased to announce that, effective 1 January 1978, Sally Cool will become assistant editor for HR, and Barbara Paschke will become associate editor for HR. Mss. Cool and Paschke have given much time and service to the production of HR.

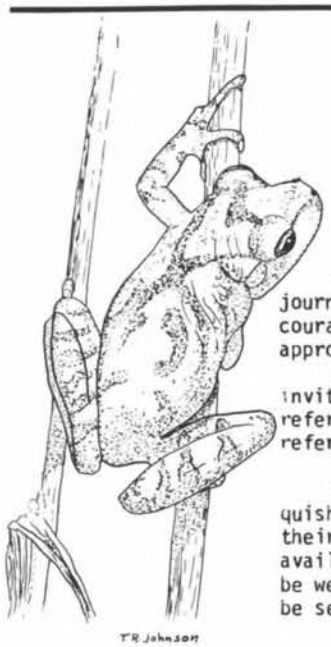
ERRATA

Herp. Review 8(1): p. 13, col. 2, para. 3, line 5: "313v." should read "elev."

Herp Review 8(3): p. 80, col. 3, para. 1, line 28: "contract" should read "contrast."

ELECTION RESULTS

Meg Stewart, Chairperson-Elect
Henri Seibert, Treasurer
Stephen R. Edwards, Secretary
Marty Crump, Director
Carl Gans, Director



Current Literature

As of January, 1977, approximately 70 searchers are scanning 400 journals. Titles are published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR.

Anyone publishing in a journal that is not widely distributed is invited to submit a complete citation or send a reprint to insure that the reference is published in Current Literature. Complete citations to obscure references are also welcome.

SEARCHERS NEEDED. In recent months several searchers have had to relinquish their commitment to Current Literature because of increased demands on their time. A number of journals are presently not being scanned and are available for reassignment to anyone who is willing to help. Volunteers will be welcome. All correspondence concerning the Current Literature project should be sent to

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Current Literature
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The University of Texas at El Paso
El Paso, Texas 79968

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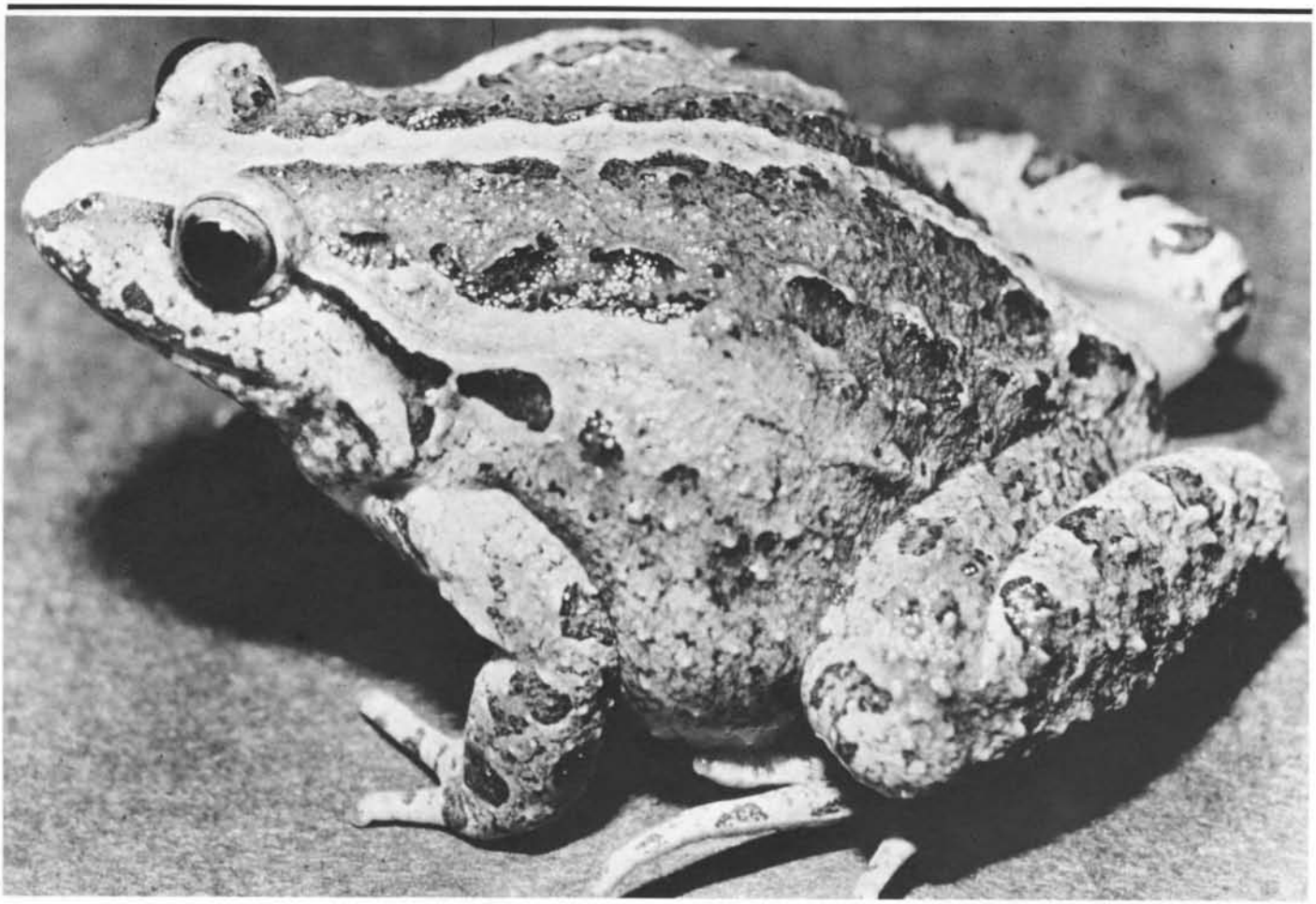
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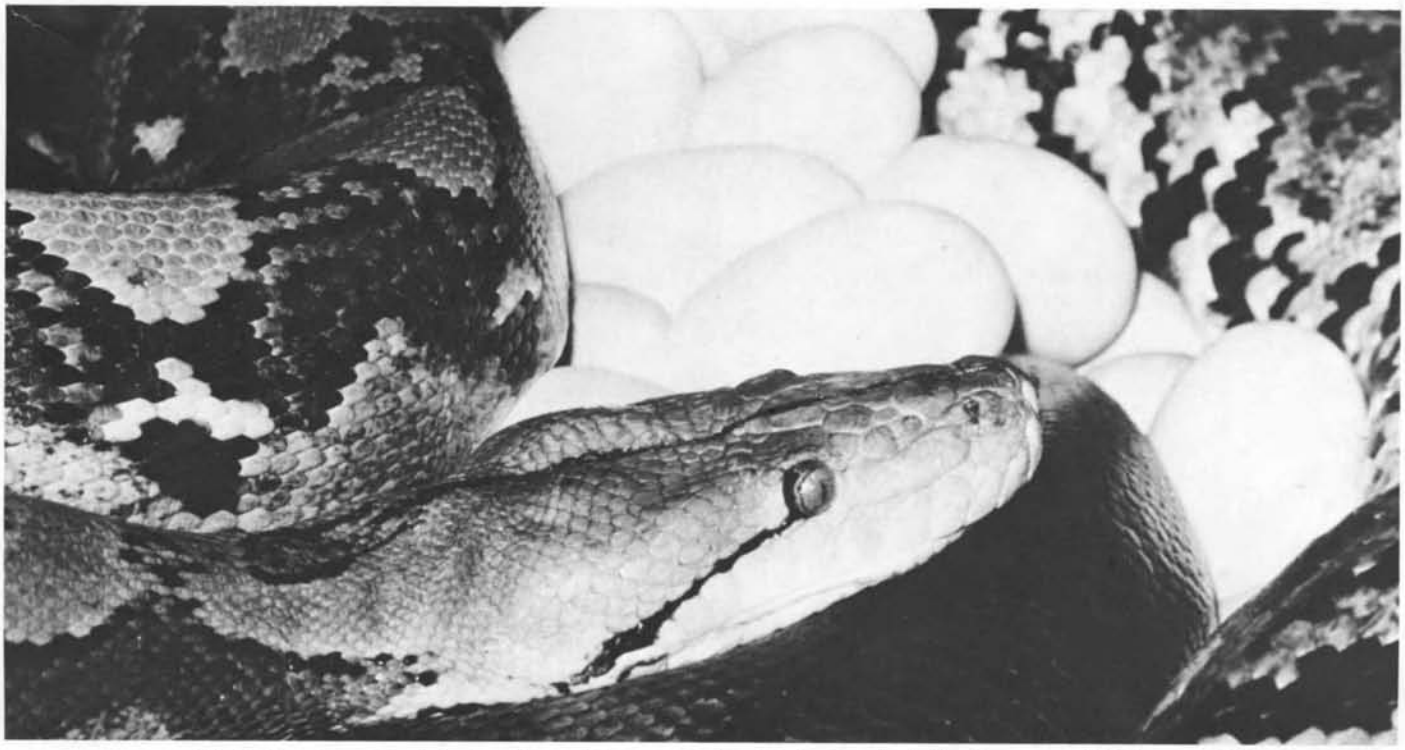
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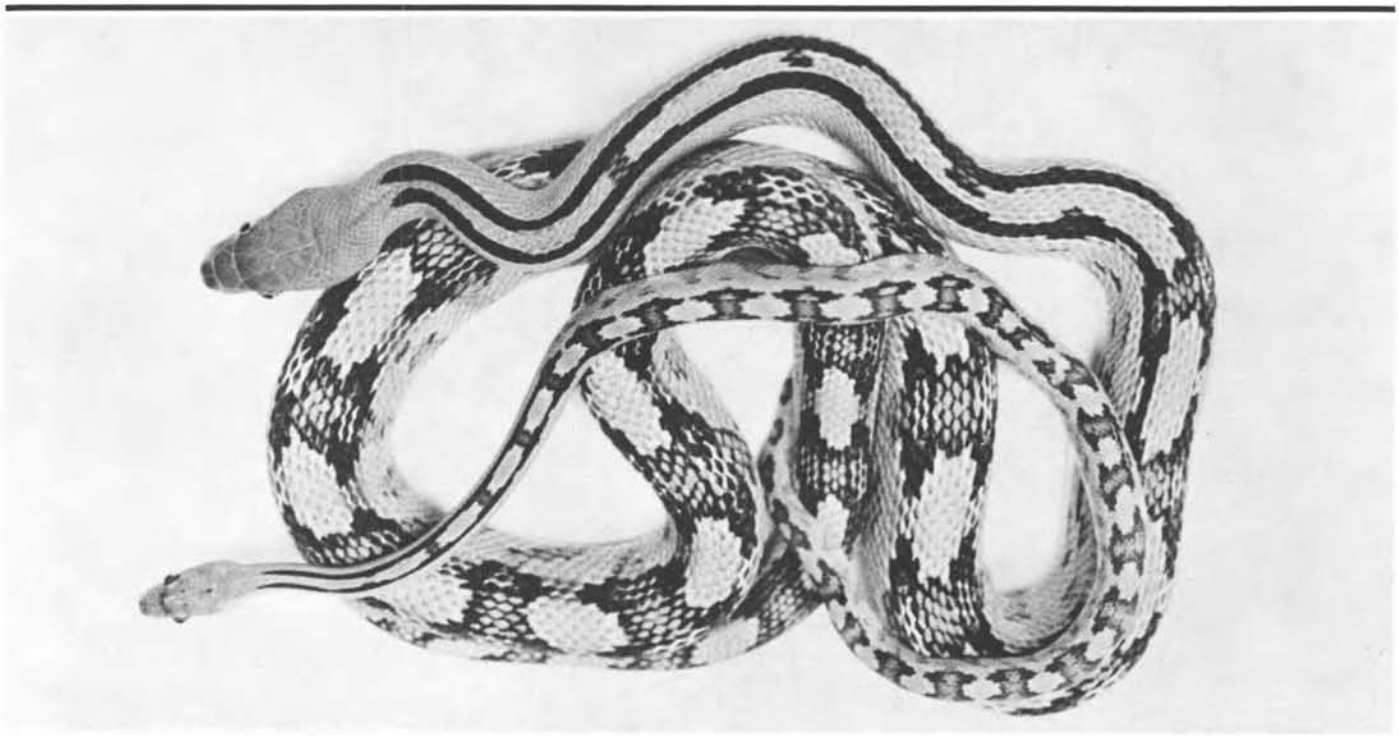
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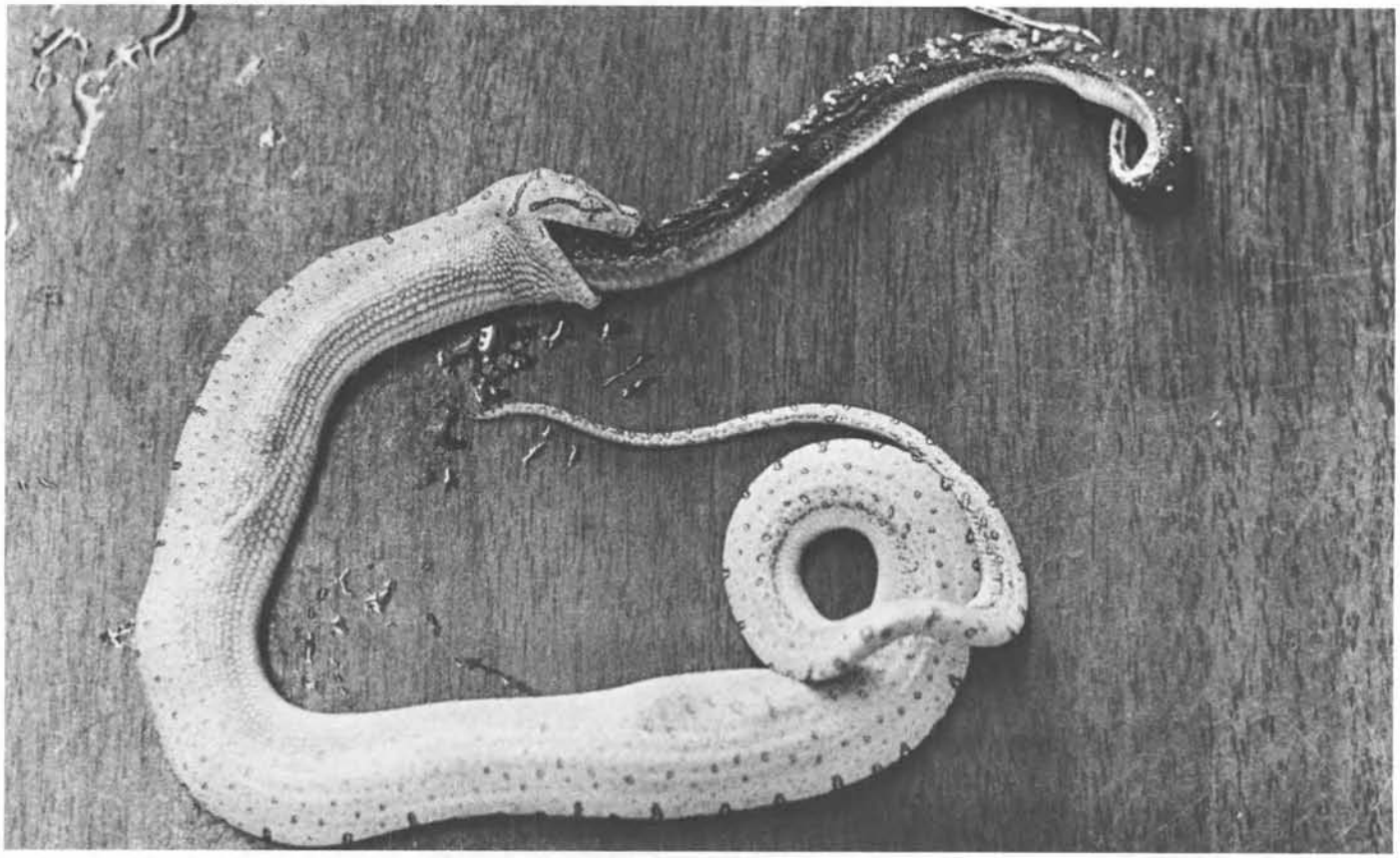
A Discoglossus pictus from Cadiz Province in Spain. Photograph by Stephen D. Busack.



Adult female reticulated python with eggs at St. Louis Zoo Reptile House on 12 February 1977. Photograph by Tom R. Johnson.



Hatchling Elaphe subocularis with two year old female parent at Fort Worth Zoological Park. Photograph by Bern W. Tryon.



Juvenile New Guinea Green Tree Pythons (Chondropython viridis). These individuals are two of five hatched at the Sedgwick County Zoo, and the first to be bred and hatched in captivity. The partially regurgitated python is brick red with a tan venter and bluish markings. The other python is lemon yellow with red markings. Adults are emerald green. In the wild juveniles are reported to eat skinks. Photograph by Linda S. Geren. Contributed by Peter Gray, Sedgwick County Zoo, Wichita, Kansas.

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Now in its tenth year, Herpetological Review remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the Journal of Herpetology -- see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Authors are urged to write the editors before submitting feature-length articles. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles are desired. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

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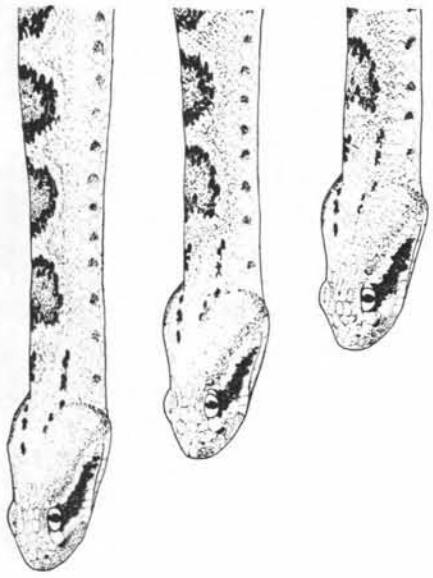
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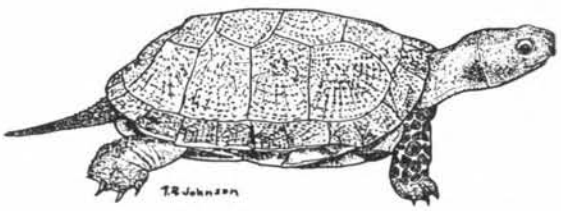


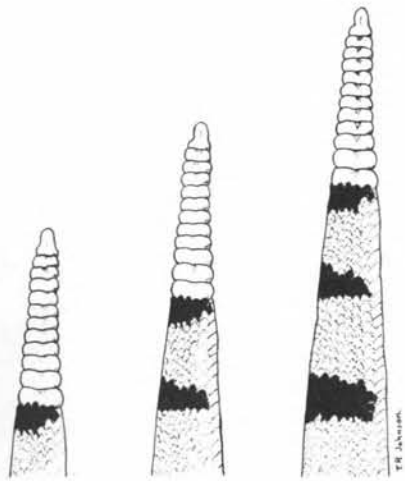
Herpetological Review

Volume 8 September 1977 Number 3

Contents

FEATURED INSTITUTION
Herpetology at the University of California at Berkeley, by D. B. Wake and J. Hanken 74
FEATURE ARTICLES
A case of gonadal atrophy in Lissemys punctata punctata (Bonnt.) (Reptilia, Testudines, Trionychidae), by P. L. Duda and V. K. Gupta 75
The status of Drymarchon corais couperi (Holbrook), the eastern indigo snake, in the southeastern United States, by H. E. Lawler 76
Observations on breeding migrations of Ambystoma texanum, by M. V. Plummer 79
BOOK REVIEWS
"This broken archipelago: Cape Cod and the Islands, amphibians and reptiles" by James D. Lazell, Jr. Reviewed by T. D. Schwaner 80
"Liste der Rezenten amphibien und reptilien. Hylidae, Centrolenidae, Pseudidae" by William E. Duellman. Reviewed by R. G. Zweifel 81
"Australian frogs: How they thrive, strive and stay alive. A review of Michael Tyler's Frogs" by W. E. Duellman 83
CONSERVATION
1977 SSAR Conservation Committee 84
GEOGRAPHIC DISTRIBUTION
New records 84
Herpetological records from Illinois, by D. Moll, G. L. Paukstis and J. K. Tucker 85
REGIONAL SOCIETY NEWS
Muhlenberg group sponsors ESHL meeting 85
Regional Herpetological Society Directory 85
Oklahoma SOS 88
NEWS NOTES 89
CURRENT LITERATURE 90
CURRENT LITERATURE ERRATA 108
ADVERTISEMENTS 109
CONTRIBUTED PHOTOGRAPHS 112
SSAR 1977 ANNUAL MEETING ABSTRACTS . . . . . Supplement





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HERPETOLOGY AT THE UNIVERSITY OF CALIFORNIA-BERKELEY

Herpetological research and education at Berkeley date from the first decade of this century. William Ritter conducted life history studies of salamanders and sponsored such students as Loye Miller. When Joseph Grinnell founded the Museum of Vertebrate Zoology in 1908, that unit became the local center for studies of ecology and systematics. Grinnell was principally an ornithologist, but he conducted research on amphibian and reptilian distribution and sponsored a number of students. Tracy Storer, Charles Camp, Jean Linsdale, Henry Fitch, and Tom Rodgers were students who later served in a variety of staff and faculty positions at Berkeley. Camp's interests shifted from living to fossil lower vertebrates, and in time he became Professor of Paleontology and Director of the Museum of Paleontology on this campus.



David Wake, whose duties as Director of the Museum of Vertebrate Zoology keep him from using his microscope.

The Museum of Vertebrate Zoology continues to be the principal center of herpetological research at Berkeley. The collections now include about 150,000 catalogued specimens, with major emphasis on western North America, Mexico, and Central and South America. Robert Stebbins was the first permanent faculty curator of the herpetological collection, and following his appointment the level of research and teaching activity in herpetology increased greatly. A second faculty curator, David Wake, joined the University in 1969 and is now Director of the Museum. A third faculty member associated with the Museum is Marvalee Wake, Associate Research Morphologist. The Museum has a wide variety of special collections and research facilities, including a fully developed laboratory for biochemical genetics under the supervision of Curatorial Associate Richard Sage. A special feature of the Museum is a large, fully catalogued frozen tissue collection which is made available to qualified investigators. The Museum operates the Hastings Natural History Reservation, a 2,000 acre reserve with laboratories and residences located in the Upper Carmel Valley near Monterey and Salinas, California. John Davis, an ornithologist who also conducts studies of lizard ecology, is the resident in charge of the Reservation.



Robert Stebbins (wearing hat), Professor of Zoology and Curator in Herpetology, graduate student, Ted Pappenfuss, and Research Associate Nate Cohen barter with local collectors in Baja California for Bipes, the subject of Ted's doctoral thesis.



Affable Paul Licht must resort to intimidation to earn the respect of his students, Duncan MacKenzie, a comparative endocrinologist, Martin Feder, who recently completed his doctoral thesis on the physiological ecology of tropical salamanders, and postdoctoral student Antonella Gallo.

Robert Stebbins has conducted studies of the ecology, physiology, systematics and conservation of amphibians and reptiles. Currently, he is deeply involved in conservation efforts associated with off-road vehicle damage to the southwestern deserts. David Wake is studying the evolutionary biology of salamanders, with emphasis on comparative and functional morphology, systematics, and distributional ecology. Marvalee Wake emphasizes morphological studies of the reproductive system in lower vertebrates, and the evolutionary biology of caecilians. O.P.



Marvalee Wake, Associate Professor of Biology and Zoology and Associate Research Morphologist in the Museum, happily contemplates caecilians.

Pearson, retired Director of the Museum, maintains an active research program, including studies of the ecology of South American lizards. Paul Licht, Professor and Chairman of Zoology, is a physiological ecologist and comparative endocrinologist, currently involved in studies of the pituitary hormones of reptiles and amphibians. Other faculty members in Zoology who conduct research on amphibians and reptiles or sponsor students in these areas, or both, include Richard Eakin (comparative embryology, photoreceptor ultrastructure), Robert Colwell (community ecology), and Howard Bern (comparative endocrinology).

Faculty members in other departments who are actively involved in research on lower vertebrates and who sponsor students in certain aspects of herpetology include Allan Wilson in Biochemistry (anuran evolution), Vincent Sarich in Anthropology (lizard evolution), Joseph Gregory in Paleontology (lower vertebrate paleontology), E.R. Lewis in Electrical Engineering and Computer Sciences (structure of anuran inner ear), and Carl Nicoll in Physiology-Anatomy (endocrinology of prolactin).



Sam Sweet, who works with spring and cave salamanders of the Edwards Plateau, finds microscopes useful in telling dorsal from ventral sides of snakes. Sam will be Assistant Professor of Biological Sciences at the University of California, Santa Barbara, starting this fall.



Ray Huey, basking momentarily, will join the University of Washington this Fall as an Assistant Professor of Zoology.

There is an active post-doctoral program at Berkeley sponsored principally by the Miller Institute for Basic Research in Science. Miller Fellowships are two years in length and offer a generous stipend as well as research support. Ray Huey is a current Miller Fellow, and other recent fellows in this program include such herpetologists as George Gorman, Steve Arnold, and Al Bennett. Other current postdoctoral students in herpetology include Antonella Gallo and Ellen Daniel (both comparative endocrinology) and Craig Gundy (lizard photoreceptors).

Research Associate Anita Pearson applies ultrastructure techniques to the study of endocrine organs. Gloria Wurst studies developmental endocrinology and collaborates with David Wake in studies of evolutionary genetics of salamanders.



Curatorial Associate Gloria Wurst works with the Museum's herpetological collection, but the electrophoresis lab is her first love.

Since 1970 a number of students have been awarded Ph.D. degrees in some aspect of herpetology, including Kristin Berry, Charles Brown, Allan Brown, Dennis Bramble, Pille Bunnell, Bruce Bury, Susan Case, James Edwards, Eduardo Fuentes, Joseph Crim, James Lynch, Linda Maxson, Virginia Maiorana, Charles Muller, John Ruben, Judy Stamps, James Stewart, and Hing Wo Tsui.



Pedro Alberch, second year graduate student from Barcelona, is enthralled with x-rays of South American salamanders.

Graduate students who have just completed their degree work include Martin Feder, Steve Ruth (comparative lizard demography), Lynne Houck (reproductive biology of tropical salamanders), and Sam Sweet. Current graduate students include Pedro Alberch, Kay Yanev, Julie Feder (hybridization of Bufo), Tom Hetherington (salamander photoreception),



Kay Yanev has lost part of her head over her computer output. She is presently completing her doctoral thesis on genetic and morphological diversification of Batrachoseps.

Ted Papenfuss, Kristine Tollestrup, Duncan MacKenzie, Ron Marlow, John Cadle (salamander evolutionary genetics and snake systematics), Jim Hanken (genetic and morphological studies of Thorius), David Dobkin (lizard ecology), Bill Rainey (sea turtle evolution and biology), Jacques Gauthier (anguinomorph lizard paleontology, comparative anatomy and evolution). Undergraduates often are involved in various research projects, and currently Brad Shaffer (who will be a graduate student at the University of Chicago this fall) and Paul Elias, both working with Guatemalan salamander biology, are the most actively involved.



Curatorial Associate Dick Sage, on right, and gradute students Kristine Tollestrup and Ron Marlow are studying the Santa Cruz Long-toed Salamander. Their main interests are the evolutionary genetics of the Rana pipiens complex, ecological studies of Crotaphytus, and the biology of desert tortoises, respectively.

DAVID B. WAKE and JAMES HANKEN, Department of Zoology and Museum of Vertebrate Zoology, University of California, Berkeley, California 94720 U.S.A.

A CASE OF GONADAL ATROPHY IN LISSEMYS PUNCTATA PUNCTATA (BONNT.) (REPTILIA, TESTUDINES, TRIONYCHIDAE)

During our studies on gonadal cycles in some fresh water turtles, we captured a normal-appearing adult female Lissemys punctata punctata (Cat. No. JUBR-57, deposited in the Museum of the Department of Bio-Sciences, University of Jammu) on 2 March 1976 from a shallow pond near Ranbirsingh Para, Jammu (India). The turtle was measured, weighed and cut open (measurements and other data are provided in Table 1). Based on our observations of gonads in this species, this specimen's gonads presented an appearance entirely different from normal ovaries. The structures did not resemble normal testes either. The specimen was definitely a female. The literature available on gonadal abnormality in chelonians (Cagle, 1950; Hansen, 1943; Risley, 1941) makes no mention of the gonadal condition observed here.

The gonads, along with their ducts, were excised, measured and weighed (see Table 1). They were washed in physiological saline and fixed in dichromate-formalin-acetic acid fixative. A small piece of the fixed material from gonads and associated ducts was processed for sectioning and staining. Sections were cut at 7 micra, stained with Mallory's trichrome stain and microphotographed.

In all its external features, the turtle appeared a normal, mature female. The gonads, here considered "ovaries", occupied the normal position in the abdominal cavity and were whitish in color and spongy in consistency. These ovaries were lobulated with deep interlobular grooves and sharp marginal notches (Fig. 1). Normal ovaries in females of comparable measurements are yellowish in color and blistered in appearance due to numerous developing follicles of varying diameters. No follicles of any size were to be seen in these structures in our specimen. Moreover, in this specimen, these ovaries were considerably lighter in weight than normal ones.

The ducts associated with these ovaries, here considered "oviducts" (Fig. 1), were not fully developed, and were shorter and lighter in weight than normal oviducts in specimens of comparable size and weight. The anterior portion of each oviduct was attached to its gonad, which is also abnormal. Not only are normal oviducts free from the ovaries and open into the abdominal cavity anteriorly, but they also show an external demarcation into 4 regions, viz., the infundibulum, the tuber, the uterus and the vagina. Such an external differentiation in the oviducts of our specimen is completely lacking.

Histologically, the ovaries in the specimen were made up of numerous large and distended lacunae of varying shapes and sizes (Fig. 2). Most of these lacunae were partially filled with sparce, light-blue staining, non-cellular debris and a few darkly stained particulate in-

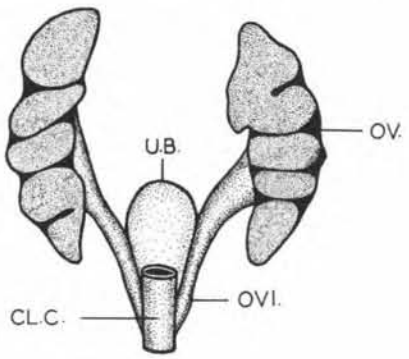


Figure 1. Lissemys punctata punctata, showing the general appearance of the abnormal ovary and the unusual connection between it and its oviduct. OV. ovary; OVI. oviduct; U.B. urinary bladder; and CL.C. cloacal chamber.

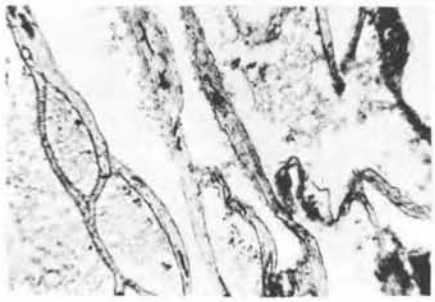


Figure 2. Cross section through the abnormal ovary, showing lacunae filled with a smear and boundary walls having blood cells and capillaries (X 120).

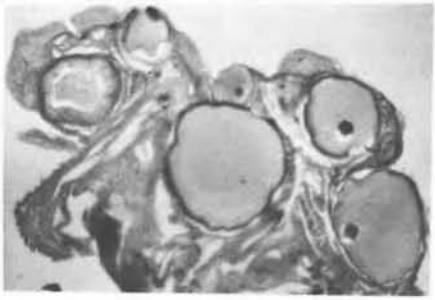


Figure 3. Cross section through normal ovary of L. punctata punctata showing oocytes at different stages of growth (X 50).

clusions. The boundary walls of the lacunae showed the presence of some globular transparent structures, of a non-cellular nature. Similar structures were also found within the lacunae. Large numbers of capillaries and free blood cells were, however, seen in the inter-lacunal filling. The normal histology of ovaries obtained during our study from individuals of comparable size and weight reveals the occurrence of oocytes at different stages of growth, a few corpora lutea and some atretic follicles (Fig. 3). As seen in transverse section, the oviducts resembled normal ones in their histological elements except for a low columnar epithelium on the lumenal side. Perhaps, the low height of the oviducal epithelium, particularly in the tuber portion, is indicative of the failure of production of the ovarian hormones responsible for preparing the oviducts for the reception of the eggs.

We feel these ovaries suffered total atrophy before producing any oocytes or eggs. Although it is presumptuous at present to attribute this type of total ovarian dysgenesis to any specific cause, a disturbed hormonal interplay as the chief factor in this case could not be ruled out.

ACKNOWLEDGMENTS

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Features Compared	Abnormal Specimen	Mean values of normal specimens (N = 3)
BODY WEIGHT	1900 gms	1083 gms
LENGTH X WIDTH OF CARAPACE	262 X 240	228 X 213
OVARY:		
1. color	whitish	yellowish
2. shape	lobulated	blistered
3. weight		
(i) right ovary	10.50 gms	11.62 gms
(ii) left ovary	9.95 gms	18.21 gms
4. follicular condition	follicles absent	numerous follicles of varying diameters
OVIDUCT:		
1. segmentation	absent	external segmentation
2. length (right/left)	290/295	675/685
3. weight (right/left)	2.38/1.75 gms	12.14/17.62 gms
4. relative epithelial height	low	high

Table 1. Comparison of various features of the abnormal specimen of Lissemys punctata punctata (cat. No. JUBR-57) and normal specimens of the species captured from the same locality and in the same month. (Measurements in mm unless indicated otherwise.)

THE STATUS OF DRYMARCHON CORAIS COUPERI (HOLBROOK), THE EASTERN INDIGO SNAKE, IN THE SOUTHEASTERN UNITED STATES

In recent years, zoologists, naturalists, and others have expressed serious concern about the apparent decline or disappearance of Drymarchon corais couperi over much of its original range. This paper will evaluate the current status of this species in the southeastern Coastal Plain.

Drymarchon corais reaches the northernmost limits of its range in Effingham County, Georgia (Moulis, 1976). It inhabits xeric sandhill habitat over most of its range. Over much of the Coastal Plain, this form might be considered endemic to habitats which support populations of the tortoise, Gopherus polyphemus. Drymarchon utilizes the deep inclined burrows of these tortoises extensively for refuge and wintering. While D. c. couperi is typically associated with xeric habitats, it is sensitive to dessication, and may additionally rely upon these burrows to reduce moisture loss during dry periods (Bogert and Cowles, 1947).

Sandhill habitat typically includes longleaf pine (Pinus australis), turkey oak (Quercus laevis), and the wiregrasses (Aristida stricta and Sporobolus junceus). Each of these species may exist in greater or lesser density, and may be complemented by other pine and oak species. Other plants include saw palmetto (Serenoa repens), prickly pear cactus (Opuntia ompressa), lowbush blueberry (Vaccinium sp.), hawthorn (Crataegus sp.), and slender yucca (Yucca sp.). The soil is sandy or loamy, and is well-drained due to the porosity and elevation of the geological deposits.

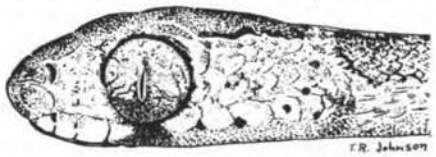
Other vertebrate commensals of Gopherus burrows on a regular or incidental basis include the gopher frog (Rana areolata ssp. capito, sevosa, and aesopus), southern leopard frog (Rana utricularia), southern toad (Bufo terrestris), oak toad (Bufo quercicus), eastern glass lizard (Ophisaurus ventralis), ratsnakes (Elaphe sp.), eastern coachwhip (Masticophis f. flagellum), southern pine snake (Pituophis melanoleucus mugitus), eastern diamondback rattlesnake (Crotalus adamanteus), cottonmouth moccasin (Agkistrodon piscivorus ssp.), red fox (Vulpes fulva), coyote (Canis latrans), river otter (Lutra canadensis), opossum (Didelphis marsupialis), striped skunk (Sylvilagus floridanus), and numerous rodents. Thirty-two species of arthropods, including several endemics, have been found in tortoise burrows (Young and Goff, 1939).

This habitat is described as a fire-subclimax (Laessle, 1942). Periodic burning is essential to maintaining optimum wildlife carrying capacity and species diversity. Such burning occurred naturally in primeval times due to lightning or from accidental or deliberate burning by prehistoric man. Managed burning every 8-10 years removes accumulated leaf litter and keeps pine and oak size short and scrubby. Increased light and reduced leaf litter is conducive to wiregrass growth, which is an essential forage for Gopherus. Tortoise density within a given area is influenced by wiregrass prolificacy. In turn, it has been suggested that burrow-constructing vertebrates may contribute significantly to the carrying capacity of a habitat (Mount, 1963). The absence of periodic burning is increasingly evident in some portions of the Coastal Plain. Such areas have reduced wiregrass growth and a much lower tortoise density per acre.

The elevated, well-drained nature of the sand ridge habitat provides a prime site for construction, agricultural and forestry development, and livestock farming. Primitive and paved roads frequently transect these habitats. Physiographically, this habitat type has always occurred as disjunct segments randomly distributed over the Coastal Plain. There is no question that remaining natural sandhill habitats are rapidly declining, both in quality and in area. It is common to observe small tracts of this habitat directly adjacent to much larger areas of completely cleared farmland or pastureland, all part of the same sand ridge. It is obvious that such small tracts are merely remnants of much larger and extensive natural ridges. Loss of this habitat type in Florida has been estimated at roughly 5% per year (Ashton, pers. comm.). Comparable loss in Georgia is apparent. Encroachment of this type not only destroys the habitat for many species but also increases the likelihood of human encounter with the conspicuous indigo and other snake species.

The use of all terrain vehicles (ATV's) such as trail bikes and dune buggies is prevalent in many otherwise well-preserved sandhill areas. Indiscriminant use of these vehicles destroys wiregrass and other ground vegetation which is essential to soil stability. Basic forage for the tortoises is also reduced. Several such areas are reverting to a dune-like nature. Gopherus is unable to construct burrows in loose, drifting sand, resulting in disruption of the entire ecological community (Franz, pers. comm.).

The association of Crotalus adamanteus, the eastern diamondback rattlesnake, with Gopherus burrows, especially during the winter months, has brought about an additional and serious pressure on the entire tortoise community. Since the rattlesnakes frequently congregate in sand ridges to winter in the burrows, the practice of forcing these reptiles from the burrows by introducing varying amounts of gasoline through a plastic hose has become widespread. The advent and growing popularity of rattlesnake roundups and rodeos, centering around several small communities in southern Georgia, Florida, and Alabama, has significantly increased this pressure.



Many snake hunters are skilled at locating a snake in a burrow by listening through the hose. One half to six ounces of gasoline, ammonia, or some other noxious chemical is then introduced into the burrow if a rattlesnake is detected. Novice hunters may "fumigate" any hole in which a sound is heard. It has been estimated by Speake and Mount (1973) that fewer than 50% of the snakes subjected to "fumigation" in this manner actually leave the burrow. Personal observations and conversations with snake hunters would substantiate this estimate. In fact, a few hunters have discarded the technique due to its relative ineffectiveness.

A high mortality in colubrid snake species for this practice has been demonstrated (Speake and Mount, 1973). Of three specimens of Drymarchon corais couperi confined in tortoise burrows overnight, and exposed to two ounces of gasoline on the following morning, two died in twelve and fourteen days. The third was released after a twenty-four day observation period. All three snakes came to the mouth of the burrow within 3 to 35 minutes after the gasoline was introduced. That Drymarchon and other serpentine commensals of the tortoise community are incidentally or purposely gassed during snake hunts is certain. Fifteen specimens of D.c. couperi were collected by gassing from one large tortoise colony in Jeff Davis County, Georgia in early 1976. All were brought to the Claxton, Georgia rattlesnake roundup, where they were sold to a visiting Florida snake dealer (Moulis, pers. comm.). Personal investigation of six additional specimens from the same county, and at the same event, revealed that they had been excavated from two burrows in a different colony by another hunter. The latter specimens were sold singly to casual visitors to the roundup. All were in poor condition, with numerous skin lesions.

The eastern indigo snake has always been widely sought as a pet or for exhibition purposes due to the large size and docile nature of the species. It is the largest serpent species in North America, and specimens approaching eight feet in length were formerly common. It has been a highly commercialized species for many years. The preference of many specimens for a specific food item, which may be unavailable to the lay keeper, raises serious questions as to its propriety as a pet. In addition, the species is known to regularly harbor linguatulids, a primative arachnid parasite which is transmissible to man (Hunt, pers. comm.).

The effect of residual pesticides on Drymarchon populations has only begun to be evaluated. Three separate samples of body fat provided by the Atlanta Zoological Park to the Georgia Department of Agriculture for analysis yielded the following results:

Metabolites of chlordane

(PPM = parts per million)

#1 female

Heptachlor Epoxide	4.02 PPM
Trans Nonachlor	1.06 PPM
Octachlor Epoxide	0.87 PPM
Dieldrin	1.37 PPM

#2 female

Dieldrin	.08 PPM
Mirex	17.20 PPM

#3 male

Trans Nonachlor	.83 PPM
Octachlor Epoxide	.61 PPM
Dieldrin	5.6 PPM

#4 male

Octachlor epoxide	0.21 PPM
Trans Nonachlor	0.43 PPM
Mirex	0.55 PPM
PCB (arochlor 1260)	4.7 PPM
Heptachlor Epoxide	0.19 PPM
Dieldrin	1.0 PPM

#5 male

Octachlor Epoxide	2.39 PPM
Trans Nonachlor	2.42 PPM
PCB (arochlor 1260)	12.3 PPM
Heptachlor Epoxide	0.65 PPM
Dieldrin	13.3 PPM

Alarmingly high levels of these materials in initial samples indicate the need for extensive analysis.

The last record for D.c. couperi in Alabama was taken in Covington County in 1954 (Neill, 1954). This species was reportedly extirpated in Mississippi in the 1930's and 1940's (Mount and Speake, in press). Only one reference to the species in South Carolina has been located (Ditmars, 1939). No specific records are known. However, remnants of

suitable habitat occur in Jasper County, South Carolina, directly across the Savannah River from identical habitat in Effingham County, Georgia. Although extensive field examination has failed to yield specimens in the South Carolina locality, there remains a possibility of a population existing there.

It is appropriate to suggest that remaining viable and natural populations of this species occur only in Georgia and Florida.

In Georgia, D.c. couperi seems to prefer the Miocene and Plio-Pleistocene marine terrace sand deposits in the middle and lower Coastal Plain of the southeastern quadrant of the state. Only one verified record for this species in southwest Georgia is available (Seminole County, Ashton, pers. comm.). Due to the paucity of suitable habitat in the Dougherty Plain, one suspects this represents a northward extension of Florida panhandle populations, rather than a continuous range across southern Georgia. All records occur in association with xeric sandhill communities. There appears to be a strong preference for tortoise communities constructed on weathered river dunes which are adjacent to or near tupelo (Nyssa aquatica) or bald cypress (Taxodium distichum) swamps, river bottoms, or large tracts of pine flatwoods. Drymarchon appears to range into more mesic habitats during periods of moderate temperature and greater precipitation. Many food species are more abundant in these wetter habitats.

In Florida, Drymarchon remains intimately associated with the sandhill habitat north of Lake Okeechobee, although it is not uncommon to find wandering individuals in decidedly mesic situations. In southern Florida, the species is often common along canal banks, where it may enter the water when pursued, or attempt to escape into the numerous crab holes along the banks. I examined thirteen specimens from these habitats at several localities off Highway 1, near Florida City, Florida, in the late 1960's. Australian pine hammocks, which often comprise the highest terrain in the area, are also frequented by the species. Judging from the escape measures employed, the crab holes are analogous to tortoise burrows in more northerly populations as a place of refuge. A DOR specimen was taken in August, 1969 on Highway 27 in Taylor County, Florida, east of Perry. The habitat was mesic flatwoods. In October, 1970, a specimen was found in a xeric sandhill, 7 miles north of Niceville, Florida, in Okaloosa County.

Florida has protected the eastern indigo snake as a "threatened" species since 1971, due to habitat reduction, wanton killing, highway fatalities, and commercial collecting (Goodson, pers. comm.). In February, 1977, the Georgia Board of Natural Resources designated Drymarchon corais couperi as a "threatened" species under provisions of the Georgia Endangered Species Act of 1973. This step provides protection throughout its remaining range. Protection in Florida and Georgia prohibits the killing, capture, possession, or sale of this animal without permits from the state of origin.

The U.S. Department of Interior, Office of Endangered Species is currently evaluating the comprehensive status of this species. It is likely that it will receive federal protection within the immediate future. Such action would provide conclusive protection throughout the original range, making reintroduction into areas of extirpation possible. Federal matching funds may then become available to the states in question for management, research, and enforcement purposes.

Dr. Dan Speake, Alabama Cooperative Wildlife Research Unit, Auburn University, the Atlanta Zoological Park, and the Savannah Science Museum are assisting the Georgia Department of Natural Resources in specific areas of field and laboratory research, public education, and captive propagation. Dr. Speake is utilizing telemetry to determine home range, habitat preferences, and seasonal movement. A similar study, funded by the Zoological Society of Atlanta, will focus upon thermal preferences.

The potential for captive breeding of D.c. couperi is good. Many areas of prime habitat appear to have extremely low population densities, if indeed any individuals remain at all. Captive breeding from stock appropriate to the proposed release sites would eliminate potential egg predation and allow the monitoring of released hatchlings to obtain data on home range, seasonal range, growth in the wild, and other information. A formal recommendation has been made to the Georgia Department of Natural Resources regarding the development of General Coffee State Park, in Coffee County, Georgia as a natural history park. This park encompasses substantial sand ridge habitat and a dense tortoise population adjacent to the tupelo swamp backwater of Seventeen Mile Creek. Self guiding nature trails could be initiated to interpret the flora, fauna, and physiography of the habitat. Such limited development would increase public awareness and interest, would further justify the state's continued support of this little-used park, and would enable the establishment of an initial state sanctuary for Drymarchon recovery and study, without additional capital expenditures by the state (Lawler, 1976).



Essential to the protection and recovery of Drymarchon corais couperi is adequate protection for Gopherus polyphemus. Pituophis melanoleucus mugitus and Rana areolata sevosa, capito, and aesopus are other commensals of the Gopherus community thought to be declining in at least portions of their ranges. Securing Gopherus habitats and development of a practical recovery program for Drymarchon would directly benefit the entire sand ridge biotic community, and would provide "survival islands" for many species in the future.

There is a consensus among scientific investigators, naturalists, and even some commercial snake hunters, that Drymarchon has seriously declined in the southeast, and is a threatened, if not endangered species. Commercial collection, habitat loss, exposure to gasoline during rattlesnake roundups, wanton killing, and residual pesticides are continuing pressures of great concern. Commercial retail value has soared to from $75 to $250 per specimen. As the species becomes scarcer, the demand and value increases. Federal protection seems to be the only effective way of dealing with this factor. In addition, political considerations within Georgia may delay enforcement of laws prohibiting "fumigation" or other disturbance of tortoise burrows. Federal protection could address this problem on federal lands. It is doubtful that Georgia will have available funds to do more than provide de facto protection within the state. South Carolina has been apprised of the importance of "endangered" status in that state, due to old records there. The very real and vital necessity of acquiring and protecting suitable habitat would be greatly aided by federal protection and associated grants-in-aid to state endangered species programs.

Without positive action toward the full protection and recovery of Drymarchon corais couperi and its prime habitat, the future survival of this and allied species appears to be highly questionable.

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OBSERVATIONS ON BREEDING MIGRATIONS OF AMBYSTOMA TEXANUM

In Kansas, Ambystoma texanum migrates to breeding sites after rains during late February or early March (Collins, 1974). This paper provides new information on various aspects of migration and reproduction in a Kansas population that I observed in 1974 and 1975.

Salamanders were collected from a one-mile stretch of blacktopped road (31st Street between Louisiana and Haskell Streets) in Lawrence, Douglas County, Kansas. Search of the road began soon after dusk on each day in which precipitation had occurred and for several days afterward from February through May. Salamanders were preserved and tagged within three hours of collection. Direction of travel, sex, and snout-vent length was recorded for each animal. In the laboratory, sizes of oviducts, ovarian eggs, opistonephric ducts, and testes were measured with an ocular micrometer or vernier calipers. Number of ovarian eggs were counted and stomach contents were examined. Statistical tests follow Sokal and Rohlf (1969).

Salamanders traveled to the low-lying fields of the Wakarusa River floodplain south of the road and then returned to the north side after breeding. The pattern of direction of travel in both years was an increasing percent of northerly directed salamanders as the season progressed (Table 1). The first appreciable rain of the year occurred on 6 March 1975 when 75 salamanders were collected traveling south. Successive collections showed an increasing percent traveling north. On a comparable date one year earlier, most salamanders were oriented north as was the case with successive collections. Salamanders had migrated south earlier as evidenced by eggs developed to yolk-plug stage found at the breeding site on 2 March. However, the road was searched on four previous occasions beginning on 12 February and no salamanders were seen. Collins (1974) found eggs in the same population as early as 25 January. No sexual differences were noted in timing or direction of travel.

	Date	n	% traveling north
1974	4 Mar	24	63
	28 Apr	17	82
	29 Apr	12	92
1975	6 Mar	75	0
	26 Mar	19	32
	7 Apr	19	74
	13 Apr	13	77

Table 1. Chronological changes in direction of travel.

Table 2 shows various statistics for pre- and post-reproductive animals. All males were mature judging from size of reproductive organs, swollen cloacas, and presence of spermatophores. Two females (SVL - 45, 46 mm) were judged immature based on undeveloped ovaries and small oviducts (0.20, 0.15 mm). Mean snout-vent length of 77 males was 74.0 $\pm$ 0.58 mm (range 60-85) whereas in 74 mature females it was 79.1 $\pm$ 0.53 (range 69-88). The difference in size is significant ($t = 6.48$; $P < 0.001$). Sex ratio was not significantly different from 1 : 1 ($X^2 = 0.06$; $P > 0.50$). Pre-ovulatory females had uniform eggs 1.4-1.7 mm in diameter. Number of ovarian eggs ($\bar{x}$ = 658 $\pm$ 24) ranged from 341-896 and was correlated with snout-vent length $\hat{Y} = -1282 + 24.1x$ ($P < 0.001$). Regression of sizes of ovi-

	n	Number traveling N or S		Percent with food in stomachs	Width of oviduct (mm)	Width of opistonephric duct (mm)	Testis area (mm)
FEMALES							
pre-ovulatory	38	1	37	18.4	2.5±0.62	--	--
post-ovulatory	35	31	4	40.0	0.9±0.03	--	--
MALES							
pre-reproductive	56	0	56	12.5	--	1.2±0.03	33.5±1.30
post-reproductive	19	19	0	36.8	--	0.6±0.04	20.7±1.12

Table 2. Comparison of various statistics between pre-reproductive and post-reproductive A. texanum. Reproductive status of males was determined a priori by direction of travel. Testes approximated a flat, ribbon shape. As an index of testis size, area was computed by multiplying length by greatest width for each testis. Oviducts were measured near the middle of their length.

ducts, opistonephric ducts, testes, and swelling of male cloacas occurred after reproduction. One post-ovulatory female traveling south on 13 April 1975 contained 58 eggs in the left oviduct; the right oviduct, measuring 1.4 mm in diameter, was empty. A significantly higher ($P < 0.05$; Sokal and Rohlf 1969, p. 607) percent of both post-reproductive males and females contained food in the stomach compared to pre-reproductive animals. Apparently, sexually active A. texanum feed little as is true for A. maculatum (Shoop, 1967). Earthworms were the most frequent food item, being found in 34 of 35 stomachs. One stomach contained a centipede and two other stomachs contained, in addition to earthworms, fragments of a beetle, a weevil, and a spider.

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Book Reviews

THIS BROKEN ARCHIPELAGO: CAPE COD AND THE ISLANDS, AMPHIBIANS AND REPTILES. By James D. Lazell, Jr., with photographs by Martin C. Michener, 1976. Demeter Press, Quadrangle/The New York Times Book Company, N.Y., N.Y. xi + 260 pp. $12.50.

The 37 species of amphibians and reptiles known from Cape Cod and its associated islands are presented to the readers of this book with true affection by the author. This is not only a systematic treatment, but a chronology of the author's, and his friends', adventures as herpetologists in the field. The emphasis is on the living animals, where they occur and what they do. The outstanding feature throughout is Lazell's ability to develop a genuine fondness for the small, sometimes slimy, secretive, and mostly misunderstood members of these two vertebrate classes. The book is a first attempt, excepting Roger Conant's field guide, to assess the herpetology of this area. The text is easily read, often humorous, interesting, informative, and sometimes caustic in its attack on individuals, professional and amateur alike. His pointed comments refer primarily to field collecting for museum specimens and taxonomic considerations. One explanation for some rather heavy language may be the author's affiliation with the Massachusetts Audubon Society, but nowhere are his biases totally unfounded.

Chapters 1 and 2 discuss the land and the sea, respectively, describing in understandable detail the glacial origins of the area, the dynamic interactions of land, wind, ice and water. Terms such as knobs, terminal moraines, kettles, pamets and tombalos are so vividly defined that they would be easily remembered, even without the fine habitat photographs. These, and similar terms throughout the text, are also italicized for easy reference. Seral stages of vegetation, subclimaxes and ecotones are described for each island group to contrast the diversity of community types in the area. Of even greater importance, in Chapter 2, the all pervasive role of the sea in shaping the coastal land masses, and cyclicly controlling temperature and salinity, is described.

Chapters 3 through 7 describe the herpetofauna. Each chapter begins with a brief overview of the general origin, distribution and systematics of the order being introduced. In several individual species accounts problems of general biological interest concerning such varied topics as genetics, physiology, and zoogeography are presented. Examples include a discussion of DNA and the genetics of polymorphism in Plethodon cinereus, the peculiar distribution of Notophthalmus viridescens in this area and the hypothesis of a correlation of distribution and the salinity of breeding sites, the taxonomic question of recognizing Notophthalmus instead of Triturus as the real generic name, the nagging question of where Hyla crucifer goes during the "off" season, and why do many herpetologists exhibit what Dr. Lazell terms "ignorance" of the literature concerning systematic revisions? Explaining to a non-biologist the role of DNA in the genetic polymorphisms of Plethodon required considerable insight and writing talent. Lazell does a fair job in about 3 pages. Those who would recognize the simplified, and basically erroneous, statement that "a gene that doesn't work is called recessive" may criticize it. But, in his context we could do much worse in explaining that gene's contract to a dominant one. I do take exception to his view of introgression as "hybrids...so well adapted to new conditions that they out breed either parental stock" (p. 108). His statement, in my opinion, refers to a hybrid swarm. Introgression more properly refers to backcrossing of the F1's by either parental populations. As to "ignorance," Dr. Lazell rightly points out the problems, but does little to indicate solutions (quite unexpected from a Massachusetts Audubon member). If one recognizes how immense was the genus (in this case Natrix), and how variable, then one must admit that a proper definition requires a monographic study of no small effort. With reference to Ed Malnate's study of the genus Natrix, such an effort has split out Natrix from three other genera, and most have accepted the split in principal (including McDowell). Douglas Rossman, an extremely thorough worker, has now separated New World from Old World Natrix, the former designated Nerodia and the latter Natrix. The original Natrix complex, thus pared down, might now be ready for a reexamination of Nerodia-Natrix-Thamnophis affinities. Classifications are slow to change--and in many cases should be. Lumping often obscures problems. Witness the long standing myth of the singular, wide ranging Rana pipiens, or the Natrix sipedon-fasciata complex as a single species group. Surely the lumping of Thamnophis with Nerodia requires more than Lazell's "footnote." The irony of the argument is that while Thamnophis may be Natrix they may not at all be Nerodia!

One recurring theme throughout the book concerns the author's almost fanatic aversion to collecting museum specimens, and the seemingly

continuous instruction against displacing individuals from their natural habitats. Unfortunately, in making his point Lazell must admit to paucities of data, or record sized specimens that were not preserved due to this philosophy. I am sure Lazell realizes the importance of museum specimens, as individual records or as series. In several places he does suggest the collection of a voucher specimen. Personally, I believe his aversion to collecting museum specimens is a ploy to down beat the tendency of the young, exuberant, and inexperienced to go hog wild! Similarly, for the several reasons and examples Lazell so clearly presents, no one should attempt displacement of a species from its natural habitat.

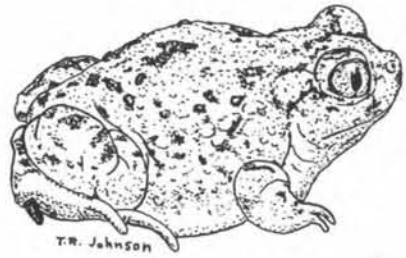
Chapter 8 concerns zoogeography of the area based on the herpetofauna. As stated, it is true that we need more in-depth field studies and perhaps less theorizing. However it is unfair, unjustified, and downright wrong to single out MacArthur and Wilson's theory of island biogeography as "worthless." The very fact that Lazell devotes a chapter to the subject and attempts new interpretations, is justification enough for the worth of their efforts.

I enjoyed this book so much that I found little more to criticize that would not be considered trite or just plain philosophical argument. A few typographical, grammatical and illustrational errors are listed here mainly to indicate I read the book thoroughly! "Cape Page" should be Cape Poge in the figure on p. 8; "tell" should be tells (p. 110, line 12); "American toads...breed later" should be breed earlier on p. 111, line 15; "occurs" should be occur (p. 111, line 31); there is an apparent smudge on the right arrow of the figure on p. 112; "impotrant" should be important on p. 140, line 2; the photograph on page 190 is upside down; shading of the figure on p. 199 obliterates locality data; "Opmeodrys" should be Opheodrys in the figure legend on p. 212; "stock" should be stocky on p. 248, line 2.

Most of Martin Michener's photographs are truly outstanding, particularly the frogs and toads, the smaller turtles, and the larger snakes. A compliment to his talents is in reference to his photograph of Natrix s. sirtalis on p. 221, which is every bit as good as the one taken by the late Isabelle Hunt Conant. Michener presents good suggestions for photographing reptiles and amphibians in the last chapter.

This book will be valuable to different groups of people. To the amateur herpetologist and the interested layman, the text will be readable, providing details that took me years to learn in the field. For the high school biology teacher there are many suggestions and examples for the use of laboratory experiments in a natural setting. Professional herpetologists will find interesting hypotheses to test, fine distributional maps, some discussion of geographic variation (however, there are no tables or figures depicting individual variation), and some soul searching arguments which I am sure Lazell will be happy to debate.

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LISTE DER REZENTEN AMPHIBIEN UND REPTILIEN. HYLIDAE, CENTROLENIDAE, PSEUDIDAE. By William E. Duellman, 1977. Das Tierreich, Lief. 95, xix + 225 p. 280 DM (about $117).

Checklists can be among the most useful documents in taxonomic biology. At their lowest level of development--as simple, unadorned lists of species on a taxonomic or geographic basis--their utility is limited and they are likely to age rapidly. But when a checklist is carefully produced to cover one or more large groups, includes extensive synonymies, gives type-localities, cites type-specimens for all species-group taxa, and is thoroughly indexed, then such a checklist is assured a permanent place in the active literature. This is such a work, and the author deserves the plaudits of his colleagues.

This checklist includes as valid taxa (by Duellman's count), 36 genera and 544 species of Hylidae, 2 genera and 55 species of Centrolenidae, and 2 genera and 4 species of Pseudidae. I made no effort to count the number of junior synonyms cited, but the index comprises 21 pages of small print--from acheta to zweifeli. The literature base for the checklist runs through 1974. References are for the most part contained within the synonymies and are given in the customary but lamentable abbreviated mode of citation, omitting titles. The entry for each taxon includes "the most recent publication on the taxon" (presumably the most recent publication of taxonomic significance or utility). If this reference does not appear in the synonymy, there is a separate entry in a terminal bibliography where the much more useful full citation style is employed.

Having expressed my admiration for this publication, I must fulfill the critic's obligation of looking at the other side of the coin. One area where this checklist may create problems for taxonomists is in its listing of "new combinations." Duellman (p. ix) states that "taxonomic changes normally should not be made in a checklist," and I agree completely. However, he finds it necessary to make some changes "for the sake of nomenclatural consistency and stability." Again, I agree that in some instances this may be appropriate; the alternative may mean cluttering the literature with numerous short notes. Some of the new combinations are really not new, however. Duellman specifies ten species of Centrolenella as new combinations (only nine appear in a list on p. ix, but a tenth, C. petropolitana, is in the body of the text), but nine of these species had already been listed under Centrolenella without being indicated as new combinations, by Gorham (1974).

Duellman (p. x) states "New combinations of names listed by Gorham (1974), none of which is supported by evidence, are not included." The difference in evidence seems to lie in Duellman's citing references some of which presumably were available to Gorham but were not cited in his less elaborate format. It would have been better had Gorham indicated new combinations where he created them, but in any event, Duellman's cavalier treatment of Gorham's useful list should not deter taxonomists from determining where particular name combinations were first used.

Tyler's (1971) resurrection of the genus Litoria for frogs of the Australian region formerly placed in Hyla raised questions as to the use of some names that, as secondary homonyms, could not be used in Hyla. One instance is Pelodytes affinis Gray, a name preoccupied by Hyla affinis Spix prior to the revival of Litoria. Nieden (1923) rejected affinis Gray and provided the substitute name Hyla tornieri. Later authors (Loveridge, 1935; Copland, 1957; Moore, 1961; Tyler, 1971) did not recognize tornieri as a valid species, but Cogger (1975), in a work published after Duellman's checklist went to press, revived tornieri (in the new combination of Litoria tornieri) and made diagnostic comparisons. Duellman too listed the species as valid, but under the new combination Litoria affini (Gray), and gave no indication of why specific recognition is warranted. The revival of affinis was improper, and according to Article 59 of the In-

ternational Code (1974 amendment), a junior secondary homonym rejected before 1961 (as Nieden did with affinis) is permanently rejected. Litoria tornieri evidently is the correct name. As an aside, I note that in the synonymy of Litoria affinis, Duellman (p. 114) lists "Hyla latopalmata latopalmata--Copland (partim)," but Copland (1957: 89) placed affinis and tornieri in the synonymy of Hyla lesueurii.

What seems to me an unwarranted revival of a senior synonym is Duellman's use of Litoria punctata Dumeril for the species known for decades as Hyla cyclorhynchus Boulenger and more recently as Litoria cyclorhynchus. The name punctata does not appear to have been used in more than 100 years, was identified with a known species relatively recently (Moore, 1961:319-320), and has an erroneous type-locality. The name would appear to be an excellent candidate for suppression as an "unused senior synonym" (International Code of Zoological Nomenclature Article 79b), and Duellman would have been well advised to "maintain existing usage...and refer the case to the Commission for a decision under the plenary powers" (op. cit., Article 23 a-b).

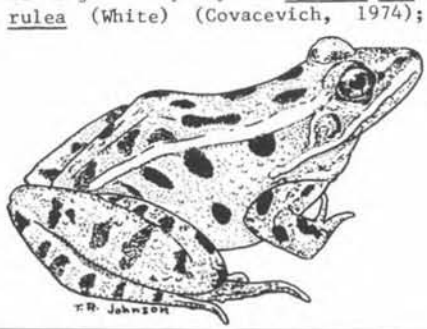
With regard to whether the author of a checklist accepts the most recently published assessment of the taxonomic status of a given form, he is in a difficult position--likely to be damned if he does and damned if he does not. A case in point is Duellman's acceptance of numerous synonymizations or changes from species to subspecies level recommended by Lutz (1973). In reviewing Lutz's book Duellman (1974) was properly critical of changes instituted therein, many of them made with little or no new evidence. I think he would have been justified in rejecting such changes in nomenclature pending more complete study. A stronger case could be made for rejecting Lutz's taxonomy than for sweeping Gorham's new combinations under the rug. In another instance, what seems to be good evidence for restoring species rank to Hyla arborea savignyi was rejected or overlooked (Schneider, 1974), and in the same species group, the decision of Bannikov, Darevsky and Rustamov (1971) to recognize Hyla japonica as a species rather than a subspecies of H. arborea should have been considered.

The area of geographic distribution is one in which some explanatory notes would be helpful. One assumes that in the absence of indication to the contrary, distributional information is summarized from the literature. But what appears to be previously unpublished information is not so identified and, hence, undocumented. An example is the range "Mountains of northeastern Venezuela and Tobago" given for Centrolenella orientalis (p. 192). The inclusion of Tobago in the range of a species known previously only from a single specimen from a montane, mainland locality 370 kilometers away should be documented.

There is a refinement that I stongly urge on future compilers of such extensive checklists as this one. That is to set aside a separate section, thoroughly indexed for species originally described within the major group covered by the checklist but since transferred to a group outside the scope of the list in hand. Presumably the compiler of a checklist will have encountered such names and will have had to decide on their disposition. Thus, little extra work is called for, and the utility of the checklist will be significantly increased.

Consider, for example, the plight of one who might wish to determine the current status of Hyla chica Noble. The logical place to look would be in a checklist of the Hylidae, but since the name was subsequently identified as a junior synonym of an Eleutherodactylus, it has no place in the hylid list. Working back through the Zoological Record, one would eventually find reference to the synonymization in the volume for 1952. Another example is Hyla chimboe Fowler, which is more of a problem because it appears in Gorham's list (1974) in this original form. Unless the reader happened upon a recent paper by Lynch (1976), he would have no way of knowing that chimboe too is an Eleutherodactylus.

Attention needs to be directed to several items so that users of the checklist who so wish may annotate their copies; I include no literature later than the closing date for the checklist, 1974: Hyla kanaima Goin and Woodley (1965) and Hyla microterodisca Werner (1921) were omitted (evidently the latter is a junior synonym of Osteopilus septentrionalis (A. Schwartz and R. Crombie, pers. commun.); Phyllocytes auratus (Boulenger) is not a new combination as indicated on pp. ix and 157, but was first used by Bokermann (1968); Litoria irrorata (de Vis), listed as a valid species, is a junior synonym of Litoria caerulea (White) (Covacevich, 1974); Gastrotheca riobambae is not in the systematic index (p. xii); the specific name of Hyla chrysoscelis is misspelled throughout the text and index ("chrysocelis").



A great accumulation of data such as appears in this checklist can lead one to statistical doodling. I restrained myself to just one such operation: Duellman lists 603 valid species of Hylidae, Centrolenidae and Pseudidae. Of these, 264 (44%) were described by persons who lived at least into the closing year (1974) of the checklist. Aside from saying something about the longevity of herpetologists, this is an indication of the activity in the field of herpetological systematics.

In addition to the general excellence of the text, this is a physically well made publication. The paper appears substantial, the binding is good and the complex job of printing was carried out with few errors apparent to me. But at what a price! Even in a time when $40 technical books are commonplace, this volume stands out at about $0.50 per page. Future compilers of similar checklists should give serious throught to seeking out alternative means and places of publication.

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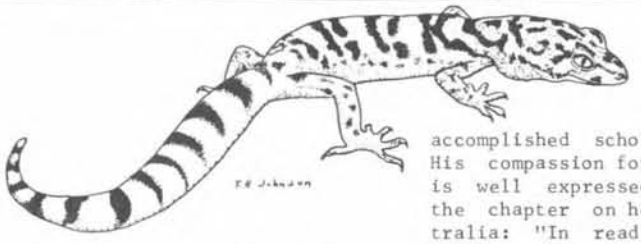
AUSTRALIAN FROGS; HOW THEY STRIVE, THRIVE, AND STAY ALIVE

(Frogs, 1976, Collins Ltd., Sydney, 256 pp.; obtainable in the U.S.A. from Taplinger Publishing Company, 200 Park Avenue South, New York, New York 10003 for $17.50).

In recent years the parturition rate of popular and semi-popular books on amphibians and/or reptiles has been so great that it seems as though the attainment of the carrying capacity of the herpetological community should be imminent. In a packed community a newcomer is likely to survive only if it fills an unoccupied niche. Such is the case of "Frogs," a delightful new book in The Australian Naturalist Library, written by Michael J. Tyler of the University of Adelaide, Australia.

In the preface Tyler tells us: "There are really two major deficiencies in this literary void [publications for naturalists on Australian and New Guinean frogs): firstly a book providing information about the lives of frogs, enabling them to be appreciated as living animals and, secondly, one designed as a field guide for identification. These two objectives are quite different, and my book is concerned only with the first one, which is just how frogs strive, thrive, and stay alive." He has succeeded admirably. "Frogs" is a book about the biology of frogs based primarily upon examples from Australia and New Guinea but with relevant comparative information about species elsewhere in the world.

In a well-organized manner, the reader is presented with 18 chapters beginning with an introduction encompassing basic internal and external structure, distribution, Australian fossils, and a lucid, candid discussion of taxonomy. The latter should be required reading for all biologists. Following are four chapters, each dealing with one of the four families of native Australo-Papuan frogs: Hylidae, Leptodactylidae, Microhylidae, and Ranidae. The sixth chapter deals with the introduced toad, Bufo marinus. Chapters 7 through 16 are concerned with "how frogs strive, thrive, and stay alive," including reproduction, diet and feeding habits, obtaining water and avoiding heat, breathing, communicating by sound, facing enemies, parasites, dispersal, geographic distribution, and frogs and man. Another chapter provides an informative account of the history of herpetology (principally frogs) in Australia. The final chapter on the study of frogs includes commentaries on identification, collecting, maintaining living frogs and tadpoles, techniques of killing and preservation, and herpetological literature. The book concludes with an appendix mostly devoted to lists of the species known from each state in Australia, an extensive list of references organized by chapters, and an index. The illustrations, although not plentiful, are of excellent quality. Thirty-four text figures illustrate principally morphological features. The four black and white and 16 colored plates are excellent; most of these are photographs, and among them are the best illustrations of Australian frogs ever published.



Although the book is directed to Australian naturalists, it far surpasses its intended goal. Tyler writes lucidly and obviously is knowledgeable and enthusiastic about his subject. He whets the reader's appetite with fascinating narratives. He engenders an overwhelming desire to get into the field so as to observe frogs and seek answers to the many intriguing questions posed by the author while he skillfully leads his readers through the maze of information about the biology of Australo-Papuan frogs.

For example, the chapter on reproduction is introduced thusly: "Frogs vary in just about every detail of their reproductive behaviour and the subsequent pattern of development of the young. It isn't just a question of species choosing to be different for the sake of it. Rather the variation is a mirror of the environmental difficulties that have been overcome, and demonstrates a wide variety of success stories."

Tyler represents a fine blend of an astute field naturalist and an accomplished scholarly researcher. His compassion for his predecessors is well expressed in a passage in the chapter on herpetology in Australia: "In reading some of the studies of modern zoologists who have needed to re-examine specimens in some of the collections that were made, it is commonplace to detect a sense of frustration, irritation, and even ridicule at what, by modern standards, are interpreted to be errors of description, resulting from slipshod work. This veiled criticism is unfair, for the only way of assessing early contributions is to appreciate the quality of the techniques of study in vogue in those times, the great difficulty of communication between herpetologists, the absence of specialist journals, the enormous array of new animals demanding attention and concepts of species." How often we forget.

Australia has had many unfortunate intentional introductions of animals. Tyler provides a fascinating account of the history of Bufo marinus in Australia since its introduction in 1935. He takes cognizance of the social and economic reasons for the introduction of the toads, discussing the biological and commercial problems resulting from their population explosion and dispersal, and suggests methods of control. Tyler's approach to conservation measures contained in the chapter on frogs and man embraces a philosophy of the greatest good of all--protection of all species on special reserves, strict regulations on rare species, freedom for amateur and professional alike to utilize and study other species, and limited commercial exploitation of some common species.

Book reviewers are supposed to be highly critical, pointing out errors in the information content, the conceptual framework, the organization, the writing, and the layout of the book. In the case of Tyler's "Frogs" I have nothing but praise, except that I would have chosen a different colored binding.

American writers have been provided with a challenge, for no comparable book has been written on American frogs. With the reading of Tyler's book my enthusiasm for visiting Australia and observing its frog fauna has increased by several factors; probably I shall not be able to await a hoped for companion volume--a field guide.

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Conservation

SSAR CONSERVATION COMMITTEE FOR 1977

Members of the SSAR Conservation Committee for 1977 (with the regions they represent in parentheses) are:

Ronald I. Crombie
(West Indies)
Jeffrey H. Black
(South-central U.S.)
Glenn R. Stewart
(Southwestern U.S.)
John H. Larsen, Jr.
(Northwestern U.S.)
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Robert H. Mount
(Southeastern U.S.)
James D. Lazell, Jr.
(Northeastern U.S.)
Robert A. Thomas
Committee chairperson



Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Conant (1956, 1975) or Stebbins (1966). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916. Short manuscripts are acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

SALIENTIA

RANA PALUSTRIS (Pickerel Frog). USA. ARKANSAS: Union Co: 10.3 km S Smackover. 7 June 1974. H.W. Robison. Southern Arkansas University uncataloged. Ouachita Co: Camden city limits at U.S. Hwy. 7, Ouachita River. 25 August 1974. L.D. Blalock. New county records extend known range within the state ca. 190 km S of nearest records in Monroe County and 83 km SE of a record in Polk County. Previous records are from extreme west, north and north central Arkansas (Dowling, 1956, Occ. Paps. Univ. Ark. Mus., 19: 18; Black and Dellinger, 1938, Occ. Paps. Univ. Ark. Mus., 2: 22).

Submitted by HENRY W. ROBISON, Dept. of Biological Sciences, Southern Arkansas University, Magnolia, Arkansas 71753. ●

SAURIA

ANOLIS SAGREI SAGREI (Cuban Brown Anole). USA. FLORIDA: Glades Co: Fisheating Creek Campground along banks of Fisheating Creek, 1 km S Palmdale off US 27. 25 March 1976. C.M. Corwin, et al. Verified by James N. Layne, Archbold Biological Station. Univ. South Alabama Nat. Hist. Mus. 2216-2217. This locality represents an extension of ca. 80 km NW and 160 km SE of Palm Beach County, and Tampa-St. Petersburg populations, respectively (King and Krakauer, 1966, Quart. J. Fla. Acad. Sci., 29: 144-154). Male and female specimens were collected, indicating a breeding colony is probably established in the area.

Submitted by CRAIG M. CORWIN, 417 Cheri Lane, Birmingham, Alabama 35215 and ALICIA V. LINZEY and DONALD W. LINZEY, Department of Biological Sciences, University of South Alabama, Mobile, Alabama 36688. ●

TESTUDINES

CHRYSEMYS NELSONI (Red-bellied Turtle). USA. FLORIDA: Baker Co: Osceola National Forest. Middle Prong, Little St. Mary's River, 7.3 km SW Taylor. 29 April 1977. Seined by C.R. Smith, W. Lippincott, and A. Powers. Verified by W. Auffenberg, Florida State Museum. FSM/UF 39066. First record for the county, and extends the range into the St. Mary's River drainage, approximately 65 km N of previously recorded localities (Carr and Crenshaw. 1957. Bull. Florida St. Mus., Biol. Sci. 2: 25-42).

Submitted by ARNOLD POWERS, c/o Department of Herpetology, Florida State Museum, University of Florida, Gainesville, Florida 32611 and C.R. SMITH, National Fish and Wildlife Lab, Gainesville, Florida 32601. ●

GRAPTEMYS GEOGRAPHICA (Map Turtle). USA. NEW YORK: Dutchess Co: Hyde Park. 1972. Donald C. Buso. Collection of Donald C. Buso. Rhinecliff. 28 July 1972. Nesting female marked and released by Erik Kiviat and Robert L. Bard. Hyde Park. 23 June to 16 July 1973. Six fresh nests. 27 August 1973. Nest with hatchlings emerging. (Seven clutches, 10-18 eggs, $\bar{x} = 15.1$). Donald C. Buso. Cornell University, R9726-9732. Staatsburg. 26 June 1975. Two nests (1 with 14 eggs, not fresh). Erik Kiviat. Bard College Field Station, uncataloged. All data from fresh-tidal Hudson River. Nearest published range margins (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston) are ca. 165 km N at Lake Champlain, and ca. 165 km W near Binghamton. The Hudson-Champlain canal (1820) may have been the dispersal route. Unverified reports suggest Hudson River range extends S to Poughkeepsie and N to Athens from localities reported here.

Submitted by ERIK KIVIAT, Bard College, Annandale, New York 12504, and DONALD C. BUSO, Hubbard Brook Experimental Forest, P.O. Box 27, West Thornton, New Hampshire 03285 ●

SERPENTES

HYPSIGLENA TORQUATA DESERTICOLA (Desert Spotted Night Snake). USA. CALIFORNIA: Siskiyou Co: 13.4 km SW Tulelake, North Hill Road. 10 June 1975. Univ. San Francisco Mus. Vert. Zool. 7501. Species apparently known but unreported from northeastern quarter of the Lava Beds National Monument as early as 1976. Considered rare in the area with only occasional specimens encountered on the road. Extends range into northern California approximately 175 km W of closest known range in northwestern Nevada (Tanner, 1944, Great Basin Natur., 4(1-2): 25-92).

Submitted by DAVID A. MULLEN, Department of Biology, University of San Francisco, San Francisco, California 94117. ●

LAMPROPELTIS GETULUS HOLBROOKI (Speckled Kingsnake). USA. COLORADO: Otero Co: 6.2 km SW La Junta. 10 July 1976. Sec. 28, T245, R55W. 30 September 1976. SW 1/4, SW 1/4, Sec. 1, T245, R55W. No date given. Jack K. Kappel. Colorado Univ. Mus., UCM 51486. Eastern extension of known range from western Kansas into southeastern Colorado (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton-Mifflin Co., Boston).

Submitted by JACK K. KAPPEL, Division of Biological Sciences, Otero Junior College, La Junta, Colorado 81050. ●

LAMPROPELTIS MEXICANA MEXICANA (Mexican Kingsnake). MEXICO. ZACATECAS: 2.74 km S Transcoso. 13 July 1964. E.A. Liner and H.A. Dundee. E.A. Liner private collection, EAL 1170. First record for this species from the state of Zacatecas.

Submitted by ERNEST A. LINER, 310 Malibu Blvd., Houma, Louisiana 70360 and HAROLD A. DUNDEE, Department of Biology, Tulane University, New Orleans, Louisiana 70118. ●

TANTILLA NIGRICEPS FUMICEPS (Texas Black-headed Snake). MEXICO. TAMAULIPAS: 16.3 km SW Reynosa on Mexico Hwy. 40. 3 July 1964. E.A. Liner and H.A. Dundee. EAL 992. This is the second record and third specimen from Mexico; all are from Tamaulipas. This record extends the range ca. 88.7 km due east on the first known locality, Mier, reported by Smith (1938, Copeia, 3: 150).

Submitted by ERNEST A. LINER, 310 Malibou B.vd., Houma, Louisiana 70360 and HAROLD A. DUNDEE, Department of Biology, Tulane University, New Orleans, Louisiana 70118. ●

HERPETOLOGICAL RECORDS FROM ILLINOIS

The following range extension and county records are reported for Illinois reptiles and amphibians.

COUNTY RECORDS. Caudata: Ambystoma texanum (Small-mouthed salamander). Effingham Co: jct. U.S. Hwy. 40 and Ill. Hwys. 32-32. 21 March 1975. J.K. Tucker. J.K. Tucker collection, JKT 67. Testudines: Pseudemys scripta elegans (Red eared turtle). Effingham Co: Lake Sara. 27 Sept. 1974. JKT 68. McLean Co. Lake Bloomington at jct. with Money Creek. 15 May 1969. Identified and released by J.K. Tucker. Sternotherus odoratus (Stinkpot). McLean Co: Lake Bloomington. 25 April 1970. T. Belander. Verified by J.K. Tucker. Illinois State Univ. Mus. #1767. Serpentes: Lampropeltis c. calligaster (Prairie kingsnake). Peoria Co: 1.6 km S Kickapoo. June 1963. Identified and released by D. Moll.

RANGE EXTENSION. Serpentes: Lampropeltis c. calligaster (Prairie kingsnake). Fulton Co: 1.6 km S Marietta. 19 April 1974. Identified and released by G.L. Paukstis and J.K. Tucker. Extends range 42 km NW and 59 km N of nearest records (Smith, 1961, Illinois Nat. Hist. Surv. Bull. 28(1): 1-298).

Submitted by DON MOLL, GARY L. PAUKSTIS and JOHN K. TUCKER, Department of Biological Sciences, Illinois State University, Normal, Illinois 61761. ●

Regional Society News

MUHLENBERG GROUP SPONSORS ESHL MEET

The Muhlenberg Group (TMG) of Augusta, New Jersey will be sponsoring the Fall 1977 Eastern Seaboard Herpetological League (ESHL) meeting. The meeting will take place on Oct. 8, from 12:30 to 7:00 p.m., and will be held at the Plains Community House, Plains Road, in Augusta. Subjects ranging from the bog turtle to sea snakes, to the conservation of amphibians and reptiles will be discussed. The following organizations are members of ESHL: N.Y. Herp. Soc., Conn. Herp. Soc., Mass. Herp. Soc., Philadelphia Herp. Soc., Md. Herp. Soc., Ga. Herp. Soc., Fla. Herp. Soc., Assoc. for the Cons. of Turtles and Tortoises, Inc., No. Ohio Herp. Soc., No. N. J. Herp. Soc., and TMG).

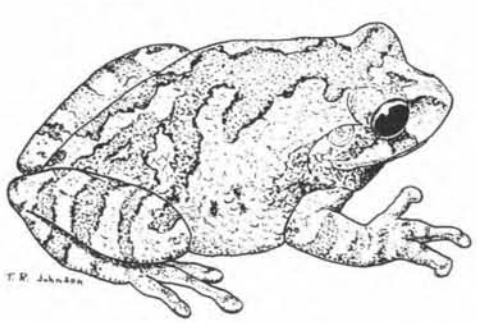
According to Mr. Tom J. Bloomer, Coordinator of TMG, the organization is in the process of printing the first in a series of field studies on members of the turtle genus Clemmys. The Bog Turtle...A Natural History is now available from TMG for 50¢ a copy plus 24¢ postage. The remainder of the natural history studies will be printed in the near future, and the accounts will be combined into a hard cover book in 1978.

Another project of TMG is the preservation of known habitats of Clemmys muhlenbergi. One area is a 100 acre bogland which must first be purchased at a cost of $300,000, and then the land will be turned over to the state of New Jersey as a bog turtle preserve. CONTRIBUTIONS FOR THIS PROJECT WILL BE WARMLY WELCOMED. Please make checks payable to: TMG Bog Turtle Fund.

The Group is also currently doing studies on other members of the genus Clemmys, on the northern pine snake, and on the Blanding's turtle.

To send contributions, or for more information, write to:

Tom J. Bloomer
The Muhlenberg Group
P.O. Box 94
Augusta, N.J. 07822 ●



REGIONAL HERPETOLOGICAL SOCIETIES

The SSAR, through the efforts of the Liaison Committee, is attempting to establish a much closer relationship with regional herpetological societies. In order to accomplish that end, questionnaires were sent to all of the societies for the purpose of compiling a current list and to gain some input as to how SSAR might be of greater assistance to regional societies.

The Committee members, Stanley Dyrkacz, Tom Johnson, Gopher Kuntz, Michael Long and Malvin Skaroff, prepared questionnaires which covered the following topics: status of the society, heirarchy of the organization, membership, publications, frequency of meetings, and other pertinent information. The response was less than over-whelming and the list reflects the amount of information that was returned. The status of many societies could not be determined so any corrections or additions would be welcome. Please send all information to:

James B. Murphy, Chairperson
SSAR Liaison Committee
621 E. Clarendon Drive
Dallas Zoo
Dallas, Texas 75203

A revised list of societies will be published each year by the SSAR.

ARIZONA HERPETOLOGICAL ASSOCIATION

c/o Bruce Bear
2206 W. Vista Avenue
Phoenix, Arizona 85021

Membership: 50
Meetings: Monthly
Publications: Newsletter

ARKANSAS HERPETOLOGICAL SOCIETY

c/o Charles Calhoun
Reptile Department
Little Rock Zoological Gardens
Little Rock, Arkansas 72201

ASSOCIATION FOR THE CONSERVATION OF TURTLES AND TORTOISES (ACTT)

P. O. Box 23 N. Hackensack Station
River Edge, New Jersey 07611

Membership: 13

BAY AREA TURTLE AND TORTOISE CLUB

c/o Sue Hillbun
176 Mission
San Rafael, California 94901
or
P. O. Box 17
2000 Allston Way
Berkeley, California 94701

Editor: Connie Cembura
Publications: Monthly newsletter

BI-STATE TURTLE AND TORTOISE SOCIETY

c/o Frederick G. Wastholz
32 Leonon Parkway
Old Tappan, New Jersey 07675

CALIFORNIA TURTLE AND TORTOISE CLUB

Box 90252
Los Angeles, California 90009

Editor: Ellen Beattie
Meetings: Monthly

CANADIAN AMPHIBIAN AND REPTILE CONSERVATION SOCIETY

c/o Barbara Froom
8 Preston Place
Toronto 12, Ontario
Canada

CHICAGO HERPETOLOGICAL SOCIETY

2001 N. Clark Street
Chicago, Illinois 60614

President: Stanley Dyrkacz
Membership: 250
Meetings: Monthly
Publications: Monthly newsletter
Quarterly bulletin

COLORADO HERPETOLOGICAL SOCIETY

P. O. Box 15381
Denver, Colorado 80215

Secretary: Louise Turner
President: Martin Balt
Meetings: Monthly
Publications: Monthly newsletter
Annual bulletin

CONNECTICUT HERPETOLOGICAL SOCIETY

c/o N. R. Ford
598 Durham Road
Guilford, Connecticut 06437

Membership: 114
Meetings: Monthly
Publications: Monthly newsletter
Annual bulletin

DALLAS HERPETOLOGICAL SOCIETY

c/o Wayne Seifert
Department of Herpetology
Dallas Museum of Natural History
P. O. Box 26193
Dallas, Texas 75226

Meetings: Monthly
Membership: 100
Publications: Monthly newsletter

EASTERN SEABOARD HERPETOLOGICAL LEAGUE

c/o Malvin Skaroff, Coordinator
1025 Lakeside Avenue
Philadelphia, Pennsylvania 19126

FLORIDA HERPETOLOGICAL SOCIETY

c/o Gopher Kuntz, Secretary
8604 Lake Christie Drive
Orlando, Florida 32609

Membership: 40
Publications: Monthly newsletter

FLORIDA WEST COAST HERPETOLOGICAL AND CONSERVATION SOCIETY

c/o John Lewis
1312 S. Evergreen Avenue
Clearwater, Florida 33515

FREE STATE HERPETOLOGICAL SOCIETY

c/o Clyde Prince
Box 285
Carter Lane
Elvaton,
Millersville, Maryland 21108

GEORGIA HERPETOLOGICAL SOCIETY

c/o John C. Zegel, President
3341 Smoke Rise Drive
Stone Mountain, Georgia 33083

GREAT LAKES HERPETOLOGICAL SOCIETY

c/o James Todd, President
15554 Cooper
Taylor, Michigan 48180

Membership: 86
Meetings: Monthly
Publications: Quarterly bulletin

GREATER GAINESVILLE BIOLOGICAL PARKS SOCIETY, INC.

c/o Eddie Leach
2131 N.W. 55th Street
Gainesville, Florida 32605

Membership: 50
Meetings: Monthly

GULF COAST HERPETOLOGICAL SOCIETY

c/o John Zapata
P. O. Box 1562
Houston Zoo
Houston, Texas 77001

INDIANA HERPETOLOGICAL SOCIETY

c/o Garry S. Bryan
453 N. Grant Street
Martinsville, Indiana 46151

NO REPLY

INDIANAPOLIS ZOOLOGICAL SOCIETY REPTILE STUDY GROUP

3120 E. 30th Street
Indianapolis, Indiana 46218

INTERNATIONAL CROCODILIAN SOCIETY

P. O. Box 217
Silver Springs, Florida 32688

NO REPLY

IOWA HERPETOLOGICAL SOCIETY

c/o Henry Wallace
147 Tonawanda Drive
Des Moines, Iowa 50312

NO REPLY

KANSAS HERPETOLOGICAL SOCIETY

c/o Janice Perry
Museum of Natural History
University of Kansas
Lawrence, Kansas 66045

President: Robert F. Clarke
Secretary: Marjorie Perry
Editor: Janice Perry
Membership: 135
Meetings: 6 per year
Publications: Newsletter

KENTUCKY HERPETOLOGICAL SOCIETY

c/o Eddie Ashmore
1300 Ambridge Drive
Louisville, Kentucky 40207

President: William T. Mobley
Membership: 60
Meetings: Monthly
Publications: Newsletter

LONG ISLAND NATURALIST SOCIETY

c/o F. C. Schlauch
415 Clift Street
Central Islip, L.I., NY 11722

MARYLAND HERPETOLOGICAL SOCIETY

Department of Herpetology
Natural History Society of Maryland
2643 North Charles Street
Baltimore, Maryland 21218

Editor: Herbert S. Harris, Jr.
Membership: 250
Meetings: Monthly
Publications: Leaflets, bulletins

MASSACHUSETTS HERPETOLOGICAL SOCIETY

P. O. Box 1082
Boston, Massachusetts 02103

President: John Rollins
Editor: David Taylor
Membership: 250
Meetings: Monthly
Publications: Newsletter, semi-annual review

MEMPHIS HERPETOLOGICAL SOCIETY

P. O. Box 11337
Memphis, Tennessee 38111

NO REPLY

MIDDLE MISSISSIPPI VALLEY HERPETOLOGISTS

c/o M. J. Lodato, President
925 Park Plaza Drive
Evansville, Indiana 47715

Membership: 4
Meetings: Irregular
Publications: None

MISSOURI TURTLE AND TORTOISE SOCIETY

c/o Jim Selke
1340 Layven Avenue
Florissant, Missouri 63031

STATUS UNKNOWN

THE MUHLENBERG GROUP

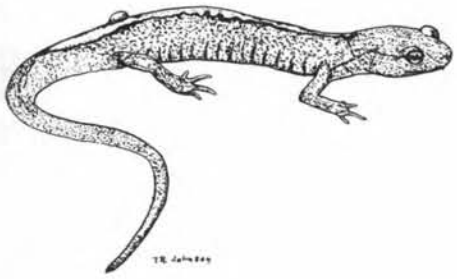
c/o T. J. Bloomer, Coordinator
P. O. Box #94
Augusta, New Jersey 07822

Membership: 42
Meetings: 3 per year

NEVADA HERPETOLOGICAL SOCIETY

c/o Bill Cobb, Jr.
4909 Eugene Avenue
Las Vegas, Nevada 89108

NO REPLY



NEW MEXICO HERPETOLOGICAL SOCIETY

c/o Department of Biology
University of New Mexico
Albuquerque, New Mexico 87131

President: Lititia C. Peirce
Editor: Lynn Mollet
Meetings: Monthly
Publications: Bi-monthly newsletter

NEW YORK HERPETOLOGICAL SOCIETY

P. O. Box 3945
Grand Central Station
New York, New York 10017

Membership: 350
Publications: Bulletin

NEW YORK TURTLE AND TORTOISE SOCIETY

c/o Martha E. Reeves
The Dial Press
750 Third Avenue
New York, New York 10017

NORTHERN NEW JERSEY HERPETOLOGICAL SOCIETY

P. O. Box 94
Augusta, New Jersey 07822

NORTHERN OHIO ASSOCIATION OF HERPETOLOGISTS

c/o Martin Rosenberg
Department of Biology
Case Western Reserve University
Cleveland, Ohio 44106

Membership: 80
Meetings: Monthly
Publications: Newsletter, bulletin

OKLAHOMA HERPETOLOGICAL SOCIETY

c/o Richard Lardie, President
1414 Parker Street
Enid, Oklahoma 73701

OREGON INSTITUTE OF HERPETOLOGY

3675 Madrona Lane
Medford, Oregon 97501

STATUS UNKNOWN

PHILADELPHIA HERPETOLOGICAL SOCIETY

c/o Malvin Skaroff, Secretary
1555 Pratt Street
Philadelphia, Pennsylvania 19124

Membership: 400
Publications: Bulletin

SACRAMENTO VALLEY HERPETOLOGICAL SOCIETY

c/o Bob Pedder
6007 Watt Avenue
North Highlands, Calif. 95660

SAINT LOUIS HERPETOLOGICAL SOCIETY

c/o Patricia Krohmer
9988 Merito Drive
St. Louis, Missouri 63128

Pres.: Randy Krohmer
Membership: 150
Meetings: Monthly
Publications: Monthly newsletter
Special issues

SAN DIEGO TURTLE AND TORTOISE CLUB

c/o Cary Herrera
7620 Eads Avenue
La Jolla, California 92037

NO REPLY

SERPENT SAFARI HERPETOLOGICAL SOCIETY

c/o Peter Emory
RFD 2
Brewster, New York 10509

NO REPLY

SOUTH FLORIDA HERPETOLOGICAL SOCIETY

c/o Saul Friess, President
9972 N. Kendall Dr., #54
Miami, Florida 33176

STATUS UNKNOWN

SOUTHERN ARIZONA HERPETOLOGICAL SOCIETY

c/o Tom Boyden, President
4521 W. Mars Street
Tucson, Arizona 85704

Meetings: Monthly
Membership: 25

SOUTHWEST FLORIDA BOIDAE RESEARCH AND BREEDING CENTER

Route 2, Box 483
North Fort Myers, Florida 33903

SOUTHWEST HERPETOLOGICAL SOCIETY

Two Chapters

San Fernando Valley Chapter
c/o Rick Korne
5730 Newcastle Avenue
Encino, California 91316

c/o Bob Sanders
Curator of Herpetology
San Bernardino County Museum
2024 Orange Tree Lane
Redlands, California 92373

TEXAS HERPETOLOGICAL SOCIETY

c/o Ann Stevens, Secretary
Route 1, Box 120
Wetmore, Texas 78163

Membership: 100
Meetings: Twice a year
Publications: Newsletter twice per year

UTAH HERPETOLOGISTS' LEAGUE

c/o Mike Coffeen, Secretary
Hogle Zoological Gardens
P. O. Box 8475
Salt Lake City, Utah 84108

VIRGINIA HERPETOLOGICAL SOCIETY

c/o F. J. Tobey, Jr., Editor
P. O. Box 1376
Leesburg, Virginia 20075

Membership: 250
Meetings: Irregular
Publications: Bulletin, newsletter

WASHINGTON (formerly Northern Virginia) HERPETOLOGICAL SOCIETY

c/o Scott Rae
317 Adahi Road, S.E.
Vienna, Virginia 21180

Co-Chairpersons: Elizabeth M. Lundell and Thomas More
Membership: 35
Meetings: Monthly
Publications: Irregular newsletter

WEST END REPTILE CLUB

c/o Toni Siquitan
2569 Leebe Avenue
Pomona, California 91766

NO REPLY

WESTERN MASSACHUSETTS HERPETOLOGICAL SOCIETY

P. O. Box 151 Highland Station
Springfield, Massachusetts 01119

WISCONSIN HERPETOLOGICAL SOCIETY

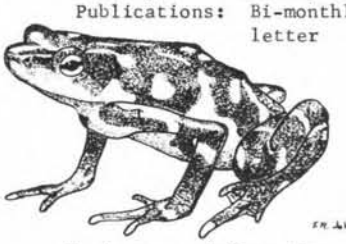
800 West Wells Street
Milwaukee, Wisconsin 53233

Max A. Nickerson, President
Membership: 70-80
Meetings: Bi-monthly
Publications: Bi-monthly newsletter

ZOO FAUNA ASSOCIATION

c/o Dan Watson-Tom Buchanan, Editors
Abilene Zoological Gardens
P. O. Box 60
Abilene, Texas 79604

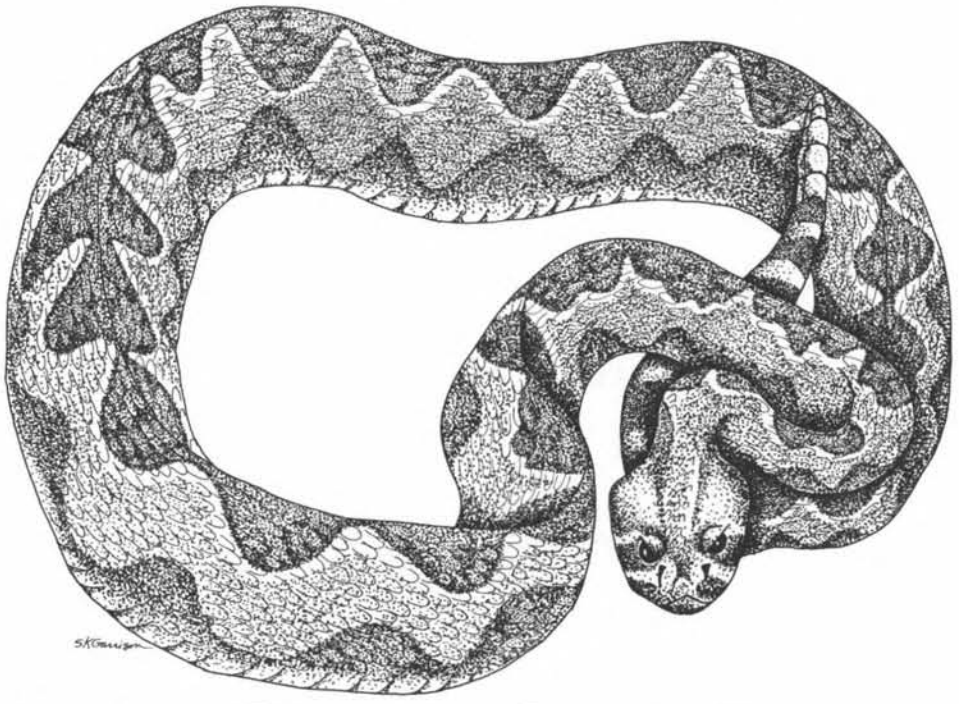
Membership: 80
Meetings: Bi-monthly
Publications: Bi-monthly newsletter



Send news information on YOUR regional herpetological society to the **Regional Society Section Editor** (See inside front cover for address). Black and white photos are welcome.

S.O.S.

(Save Our Snakes)



Help Stop Oklahoma Rattlesnake Roundups

For information on how you can help, write:

Oklahoma Herpetological Society
c/o Dr. Jeffrey H. Black
Department of Biology
Oklahoma Baptist University
Shawnee, OK 74801

News Notes

AN OPEN LETTER ON AGAMID LIZARDS

As most museum curators already know, my doctoral thesis concerns the systematics of the lizard family Agamidae. During the course of my research, I have developed working correspondences with other herpetologists also studying various agamid taxonomic problems. In order to prevent duplication of effort and results by other persons, I shall summarize below which taxa are presently under study and by whom.

For my doctoral thesis, the monotypic genera or genera with only a handfull of species will be adequately treated. These genera include: Acanthosaura, Aphaniotis, Brachysaura, Ceratophora, Chelosania, Cophotis, Dendragama, Hydrosaurus, Lophocalotes, Lyriocephalus, Moloch, Oriocalotes, Otocryptis, Physignathus, Psammophilus, Ptyctolaemus, Salea, Sitana, and Xenagama. Leiolepis and Phoxophrys have already been revised in recent years by Gunther Peters and Robert Inger respectively.

I am also preparing revisions of the species of the larger genera Gonocephalus and Uromastyx, and of the sub-genus Pseudocalotes within the unwieldly genus Calotes. The "amphibolurine" radiation of agamids in Australia, including Amphibolurus, Caimanops, Chlamydosaurus, Diporiphora, Lophognathus, and Tympanocryptis, is being studied by Geoffrey Witten and other students of Harold Cogger in Sydney. The difficult genus Phrynocephalus is being independently studied by Gunther Peters in Berlin and Ronald Whiteman at the University of California at Fullerton.

The polyphyletic assemblage Agama is finally receiving long overdue attention. The sub-genus Stellio, the whorled-tail forms, is being revised by Gunther Peters. The Agama hispida species complex in southern Africa is being revised by G.R. McLachlan at Cape Town. Benedetto Lanza of Florence has completed a review of all Agama species, including several rare endemics, of Somalia. Dirk Kreulen of Holland is reviewing the Agama agama-lionotus-planiceps complex in the rift region of East Africa. Wolfgang Bohme and I are studying the relationships of several Agama species of the Sudanese vegetational belt of northern Africa.

Four diverse agamid genera are thus available for revision: Japalura, Draco, Calotes (excluding the sub-genus Pseudocalotes), and the sub-genus Trapelus, removed from Agama. This latter taxon includes the following species and many synonymous names: agilis, blanfordi, isolepis, sanguinolenta, savignyi, jayakari, flavimaculata, tournevillei, fieldi, kirmanensis, mutabilis, pallids, agnetae, ruderata, megalonyx, rubrigularis. Willi Hennig, famous for his original contributions to cladistics, revised Draco in 1936 for his doctoral thesis. He recognized 16 species and 21 subspecies, not including the nominate forms. However, given the analagous island archipelago radiation of Anolis, I would strongly recommend a reexamination of Draco.

I hope that the above information will be of use to other herpetologists. I will gladly share my voluminous notes concerning the whereabouts of type specimens and my lists of species available for study in all museums in America and Europe. I would also appreciate being informed of other agamid studies, in the present and the future, in order to continue a cooperative effort in the study of agamid lizards.

SCOTT MOODY, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 48109 USA.

TORTOISE DATA DESIRED

Persons having data on care in captivity, field observations and/or photographs of rare species of tortoises may wish to contact Wayne Labenda. Mr. Labenda plans to publish a book about tortoises and can be reached at: 15 North Winifrd Drive, Totowa, New Jersey 07512.

SSAR STUDENT PRIZE COMMITTEE

The SSAR Student Prize Committee for 1977 consists of Robert Bezy, Thomas H. Fritts, Kirkland Jones, Richard Wasserzug and Margaret Stewart (chairperson). The committee awards a cash prize for the best student paper published in the SSAR's Journal of Herpetology.

INFORMATION NEEDED BY FWS ON DRYMARCHON CORAIS COUPERI

The Fish and Wildlife Service now has information on file that the Eastern indigo snake (Drymarchon corais couperi) should be determined to be Threatened. On August 1, 1977, they published in the Federal Register (42 FR 38921-38924) a proposal to make such a determination.

The Office of Endangered Species would appreciate the assistance of you or your colleagues in:
--providing any factual data you may have access to concerning the status of this species;
--advising them of any special considerations that should be taken into account prior to their final determination of the snake's status;
--location of critical habitat;
--providing any other advice or guidance you feel relevant.

The formal comment period for this proposal expires on October 30, 1977. Direct replies to Jack N. Berryman, Acting Associate Director, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

DUTCHESS COUNTY NY ZOOLOGICAL SURVEY

Data on reptile and amphibian distributions from Dutchess County, New York are wanted for a study of the vertebrate fauna and habitats of the County. Especially desired is information on uncommon, rare or declining species, or species at geographical range margins. The Survey will generate recommendations for the conservation of rare species and rare habitat types on a county basis. A summary of data is available, and a detailed report is in preparation. Rare species localities information will be used discreetly. Write to: E. Kiviat, Bard College, Annandale, New York 12504.

ABSTRACT OMITTED

The abstract of Dale R. Jackson's paper was inadvertently omitted from HR volume 7 (1976), and is as follows:

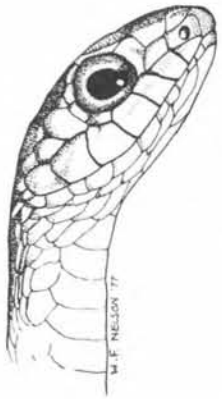
Reproductive Strategies of Sympatric Freshwater Turtles in North Florida. Reproductive strategies of four freshwater emydine turtles (Chrysemys nelsoni, C. floridana, C. scripta, and Deirochelys reticularia), which are sympatric in a narrow zone in north peninsular Florida, were determined by ovarian examination and field observation. All are iteroparous, multiple-clutched species which utilize an r-strategem, largely in response to predation losses at early stages. Developmental quiescence (pre-embryonic diapause) at low temperatures enables two species to nest during late fall and winter. Seasonal ovipositional differences may serve as a means of resource partitioning, predator avoidance, or as a response to seasonal resource availability. Dale R. Jackson, Department of Zoology, University of Florida, Gainesville, Florida 32611.

ERRATA HR 8(2) JUNE 1977

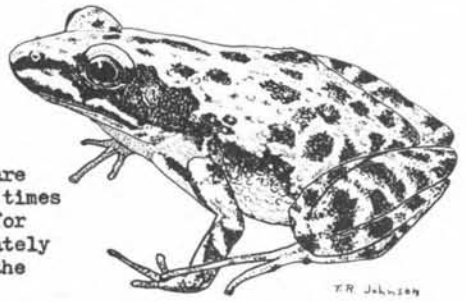
Page 40, col. 3, para. 4, line 3, "R.S. Funk. Verified by J.K. Tucker." should read R.S. Funk and J.K. Tucker."

Page 40, col. 3, para. 4, add at end of paragraph "and is 34 km NNE of isolated colony at Effingham, Effingham Co. (Brown, Funk, Moll, and Tucker, 1975, Herp. Rev. 6(3): 78-79)."

Page 40, col. 3, para. 5, line 2, "Cassady" should read "Cassidy."



Current Literature



As of January, 1977, approximately 70 searchers are scanning 400 journals. Titles will be published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR. Any correspondence concerning the Current Literature Project should be sent to

Richard D. Worthington
Current Literature
Department of Biological Sciences
The University of Texas at El Paso
El Paso, Texas 79968.

A

ABDEL-FATTAH, R. F. and F. AL-BALOOL
1977. The effect of hormones on glucose absorption by the intestine of the lizard Uromastyx microlepis Part I. Thyroxine and Adrenaline. HERPETOLOGICA 33(1):102-108.

ADRIAN, C.
1976. Wiederbelebung einer Landschildkröte [Testudo graeca]. AQUAR.-MAG., STUTTGART 10(9):386-387.

AIMAR, C.
1977. Controle cytoplasmique de la segmentation chez les Amphibiens; modifications des rythmes du clivage de l'oeuf apres injection de cytoplasme heterospecifique. C. R. ACAD. SCI. (PARIS) D 284(3):215-218.

ALBERCH, P. and D. GONZALEZ
1973. Notas sobre distribución, biótopo, morfología y biometría del Pleurodeles waltlii Michaelles en el NE de la Peninsula Iberica (Amphibia, Salamandridae). MISCELANEA ZOOLOGICA III(3):71-82.

ALCHER, M.
1975. L'Urodèle Euproctus platycephalus (Gravenhorst, 1829): répartition géographique et exigences thermiques. VIE MILIEU C 25(1):169-179.

ALEKSIUK, M.
1977. Sources of mortality in concentrated garter snake populations. CAN. FIELD NATUR. 91(1):70-72.

_____.
1977. Cold-induced aggregative behavior in the red-sided garter snake (Thamnophis sirtalis parietalis). HERPETOLOGICA 33(1):98-101.

AL-ZAHID, G., G. M. SCHOEPFLE and W. F. BRIDGERS
1976. The action of cyclohexamide on the action potential and protein synthesis in medulated Xenopus axons. EXPERIENTIA 32:1281-1283.

AMBROSIUS, H.
1976. Antibody production in reptiles. IN Comparative Immunology. Marchalonis, J. J., ed. New York: John Wiley & Sons, 298-334.

ANDERSON, M. P.
1976. Investigations on the pathogenesis of nutritional osteodystrophy in the lizard, Iguana iguana. DISS. ABSTR. INT. B-37(2): 705.

ANDREWS, S. M., M. A. E. BROWNE, A. L. PANCHEN and S. P. WOOD
1977. Discovery of amphibians in the Namurian (upper Carboniferous) of Fife. NATURE 265(5594):529-532.

ANNAYEV, D.
1976. New species of filaria (Thamugadia ivaschkini Nov. sp.) from the gecko Gimnodactylus caspius in Turkmenistan. IZV. AKAD. NAUK TURKM. SSR. BIOL. NAUK 4:75-78.

ANONYMOUS
1976. Alligators stage comeback; may be moved from endangered to threatened list. BIOSCIENCE 26(8):516.

_____.
1976. Dr. Oliver retires as aquarium director. ANIM. KINGDOM 79(3):1.

_____.
1976. Schwarzweisser Teyu, Tupinambis teguixin. AQUARIA 24(5):n.p.

_____.
1977. Year of the serpent. ANIM. KINGDOM 80(3):N3. [Reptile house nursery.]

_____.
1977. Pretty poison. ANIM. KINGDOM 80(3): N4. [Dendrobatid frogs.]

_____.
1977. First captive breeding of Aldabra giant tortoises. ANIM. KINGDOM 80(3):33.

_____.
1977. NYZS conservation projects around the globe. ANIM. KINGDOM 80(3):N6. [Auffenberg and rock iguana.]

ARNDT, R. G.
1977. Notes on the natural history of the bog turtle, Clemmys muhlenbergi (Schoepff), in Delaware. CHESAPEAKE SCI. 18(1):67-76.

ARNTZEN, J. W. and M. SPARREBOOM
1976. Enkele waarnemingen aan de amfibieenfauna van de Tatra en de Beskiden (Polen). LACERTA, THE HAGUE 34(11):146-148.

ATAYEV, C.
1976. Concerning rare species of reptiles in Turkmenistan. IZV. AKAD. NAUK TURKM. SSR. BIOL. NAUK 3:9-14.

ATWELL, J. L. and J. J. MARCHALONIS
1976. Immunoglobulin classes of lower vertebrates distinct from IgM immunoglobulin. IN Comparative Immunology. Marchalonis, J. J., ed. New York: John Wiley & Sons, 276-297.

AXTELL, C. B.
1976(1977). Comparisons of morphology, lactate dehydrogenase, and distribution of Rana blairi and Rana utricularia in Illinois and Missouri. TRANS. IL. ST. ACAD. SCI. 69(1):37-48.

BADHAM, J. A.
1976. The Amphibolurus barbatus species group (Lacertilia: Agamidae). AUS. J. ZOOL. 24(3):423-444.

BAILEY, P.
1976. Food of the marine toad, Bufo marinus, and six species of skink in a cacao plantation in New Britain, Papua, New Guinea. AUS. WILDLIFE RES. 3(2):185-188.

BAKER, M. R.
1977. Redescription of Oswaldocruzia pipiens Walton, 1929 (Nematoda: Trichostrongylidae) from amphibians of eastern North America. CAN. J. ZOOL. 55(1)104-109.

BALLS, M. and L. N. RUBEN
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ERRATA

In the preparation of Current Literature for Herpetological Review 8(2) the pretyped mats were shortened for photoreduction without careful attention to the continuity of citations. The following corrections are submitted:

Page 45, col. 2, lines 1-59. The following titles were published by W. BISCHOFF:

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1976. Bemerkungen zur Herpetofauna von Bakuriani AQUARIEN TERRARIEN Z. 29(9):316-317; (10):355-358.
1976. Echsen des Kaukasus, Teil 10. Die Streifeneidechse Lacerta strigata Eichwald 1832. AQUAR. TERR. (B) 23(3):84-88.
and W.-E. ENGELMANN
1976. Herpetologische Ergebnisse einiger Sammelreisen im Kaukasus und in Transkaukasien. ZOOL. JAHRB. ABT. SYST. OEKOL. GEOGR. TIERE 103(3):361-376.

Page 47, col. 2, lines 1-4. The following title was published by C.-H. CHAI:

1975. A histological study of the tooth of Iguana iguana. [in Jap.] JAP. J. HERP. 6(2):51.

Page 49, col. 2, lines 1-24. The following titles were published by P. FROESCH-FRANZON:

1974. Australische Riesenschlangen II. AQUARIA 21(11):167-172.
1974. Die Eidechse vom Fenstersims. AQUARIA 21(12): 184-185.
1975. Fesselnder in der Natur als im Terrarium: Natrix natrix helvetica, die Barren-Ringelnatter. AQUARIEN TERRARIEN Z. 28:428-430.
1975. Vipera ammodytes und Vipera ursini im Tessin? AQUARIA 22(8):114-117.
1975. Sind Terrarianer gleichzeitig auch Naturfreunde? AQUARIA 22(10):155-156.
1976. Die grüne Faszination. AQUARIA 23(2):17-24.
1976. Vipera aspis: Abnorme Kopfbeschuppung - Folge von Kreuzung? AQUARIA 23(1):11-13.

Page 52, col. 1, lines 1-4. The following title was published by J. HEILER:

1976. Gepanzerte Mimosen (Wachstum und Krankheiten der Wasserschildkroten). AQUAR. MAG. 10:464-468.

Page 55, col. 2, lines 1-6. The complete title for the first citation and correct authorship is as follows:

LUTTENBERGER, F.
1976. Zur Ökologie der Braunfrösche, Rana t. temporaria und Rana arvalis wolterstorffi, DAS AQUARIUM M. AQUA TERRA 10(4):173-179.

_____.
1976. Yawning in Testudo gigantea (Testudinidae). HERP. (BULL. N. Y. HERP. SOC.) 12(1-2): 16-20.

Page 56, col. 1, lines 1-10. The following titles were published by B. MARTIN:

1976. Notes on breeding behavior in a captive pair of Sonora Mountain kingsnakes, (Lampropeltis pyromelana). BULL. MD. HERP. SOC. 12(1):23-24.
1976. A reproductive record for the New Mexican ridge-nosed rattlesnake (Crotalus willardi obscurus). BULL. MD. HERP. SOC. 12(4):126-128.

Page 57, col. 2, lines 1-4. The complete title is as follows:

MORAN, D. J.
1976. A scanning electron microscopic and flame spectrometry study on the role of Ca^{2+} in amphibian neurulation using papaverine inhibition and ionophore induction of morphogenetic movement. J. EXP. ZOOL. 198(3): 409-416.

Page 58, col. 1, lines 1-3. The following title was published by A. MUTH:

1977. Eggs and hatchlings of captive Dipsosaurus dorsalis. COPEIA 1:189-190.

Page 63, col. 1, lines 1-4. The following title was published by M. SCHOBER and H. G. WORRACK:

1976. Kooperation bei der Nachzucht von Elaphe obsoleta quadrivittata. AQUAR. TERR. 23(3): 102-103.

Page 63, col. 2, lines 1-4. The following title was published by H. M. SMITH and M. Á. DEL TORO:

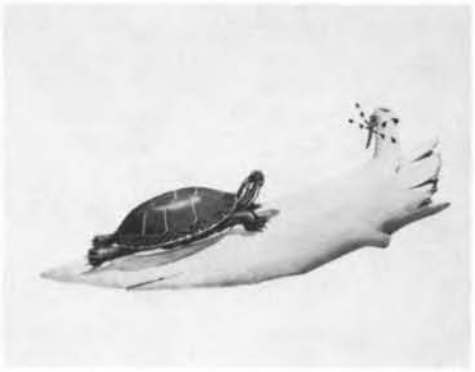
1977. A new troglodytic lizard (Reptilia, Lacertilia, Xantusiidae) from Mexico. J. HERP. 11(1):37-40.

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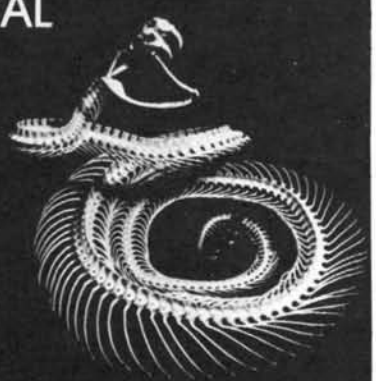
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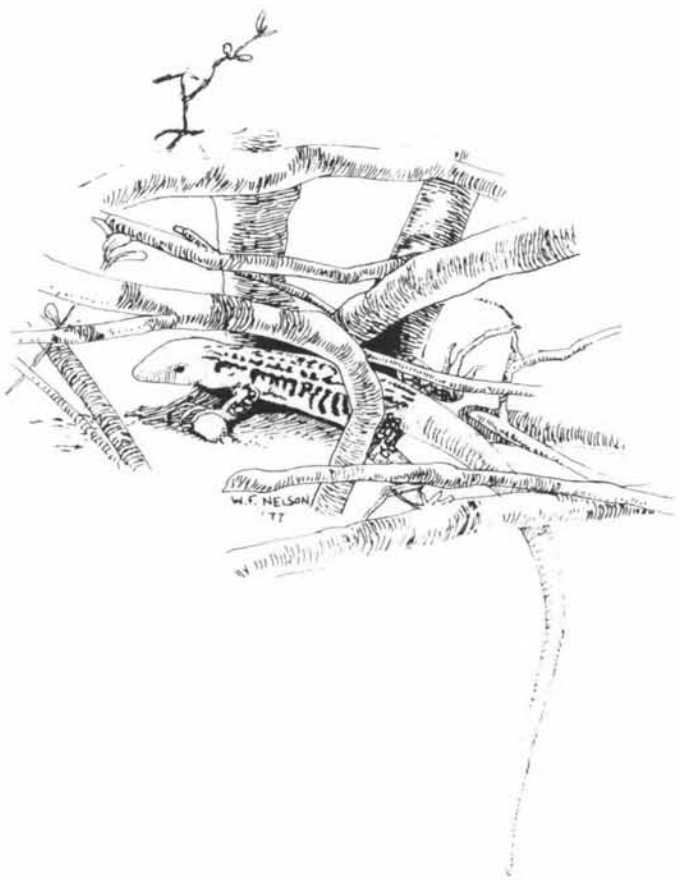
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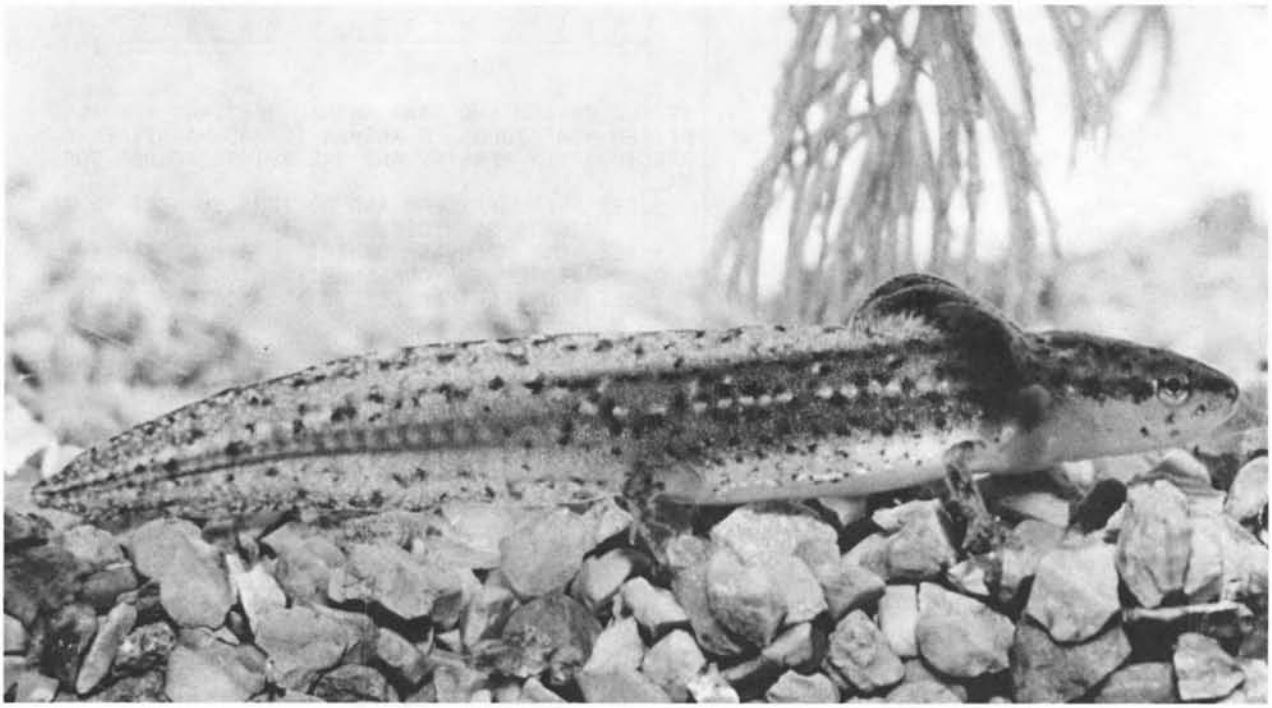
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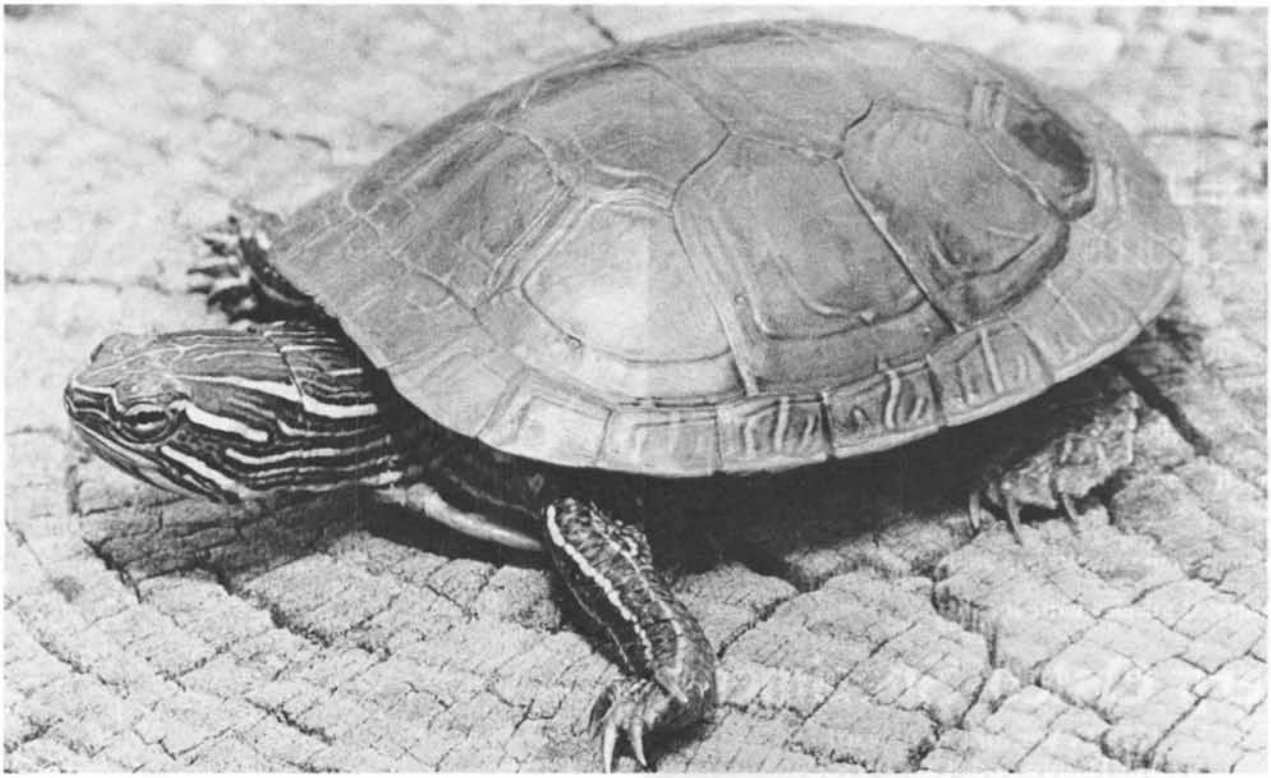
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W.F. NELSON '77



Central newt larvae (Notophthalmus viridescens louisianensis) collected from farm pond in Pulaski County, Missouri, on 5 July 1975. Photograph by Tom R. Johnson.



One of two western painted turtles (Chrysemys picta belli) collected from a farm pond in Grant County, Oklahoma during May 1977. Collected by Michelle Warner, elementary student from Caldwell, Kansas. Photograph by Larry Miller.

CONTRIBUTION TO THE COMPARATIVE CYTOMORPHOLOGY OF HYLID FROGS FROM VENEZUELA. Mercedes L. Acuna. Universidad de Oriente, Cumaa, Venezuela.

The available data from comparative hematology led to the conclusion that there are significant differences among groups of anura from tropical and temperate zones. In order to provide some information about comparative cytomorphology of Hyla from Venezuela, Hyla x-signata, Hyla crepitans, Hyla robertsimoni, Hyla geographica, and Hyla rostrata were selected for the present study.

Blood cell morphology and white cell differential counts were made. On the basis of cytoplasmic staining reactions and corresponding nuclear characteristics as well as size and shape of cells, the morphological features of cell types in smears stained by the Giemsa's method are described. Leucocyte differential counts are also presented by determinations from blood smears. Results and significant differences obtained in this study will be discussed and compared with those from temperate zone frogs.

HEMATOLOGICAL OBSERVATIONS ON SOME ANURANS FROM VENEZUELA. Mercedes L. Acuna and Felicia C. Rodulfo. Universidad de Oriente, Cumana, Venezuela.

The hematology of six species of anurans from the northeastern part of Venezuela (Hyla x-signata, Hyla crepitans, Hyla geographica, Pseudis paradoxa, Bufo granulosus and Leptodactylus fuscus) are compared. Determinations included blood cell counts, hematocrit values, hemoglobin concentrations, and calculations of mean corpuscular volumes, mean corpuscular hemoglobin and mean corpuscular hemoglobin concentrations.

Significant differences among the Hyla were observed in all the hematological indexes. Comparisons of the hematological parameters were made among groups in relation to different habitats. Significant differences were found between arboreal Hyla x-signata and aquatic Pseudis paradoxa. However, no significant differences were observed when the terrestrial Bufo granulosus and Leptodactylus fuscus were compared with the aquatic Pseudis paradoxa. Even though the presently available data are too few to permit more precise statements, the tentative interpretation is that the influence of ecological factors are reflected in the variations of the hematological parameters.

Aldridge, Robert - see Weil

MYOLOGICAL STUDIES ON THE RELATIONSHIP BETWEEN THE ANURAN PREPOLLEX AND PREHALLUX. Marshall L. Andersen. University of Kansas, Lawrence, Kansas.

Hypotheses concerning the relationship between the anuran prepollex and prehallux suggest that the prehallux and prepollex are homologous structures or that the prepollex actually represents the first digit of the anuran manus. Skeletal structure favors the first hypothesis. Recent intensive investigations into the comparative osteology and myology of the manus and pes of 16 families of anurans, however, appears to favor the second hypothesis. The musculature of the prehallux is relatively simple and arises from the plantar aponeurosis. The muscles of the prepollex have a more complex arrangement and arise from the os capitato-hamatum as does similar musculature on the four recognized digits.

REGULATION OF POPULATION SIZE IN A TROPICAL LIZARD, ANOLIS LIMIFRONS. Andrews, Robin M., A. Stanley Rand, and S. Guerrero. Virginia Polytechnic Institute and State University, Blacksburg, VA (senior author) and Smithsonian Tropical Research Institute, Balboa, Canal Zone.

We have been censusing A. limifrons on Barro Colorado Island in Panama since 1971. The population exhibits annual turnover and consistent seasonal changes in age structure primarily as a result of decreased fecundity during the dry season. Population density has fluctuated markedly from year to year. The affect of weather, predation, parasitism, and food availability on survivorship and fecundity has been investigated. Leslie matrix models are used to evaluate the relative importance of the above factors in determination of population density.

INVESTIGATION INTO THE NATURAL HISTORY OF PSEUDACRIS ORNATA IN NORTH CENTRAL FLORIDA-PRELIMINARY REPORT. Ray E. Ashton, Jr., Patricia Ashton, North Carolina State Museum and David Deitz, University of Florida.

Adult Pseudacris ornata were captured in and around cypress head breeding sites at the beginning of the winter breeding season. Frogs were tagged subcutaneously with Cobalt 60 radioactive wire and released. Movements were monitored at 24-48 hour intervals using a Thyac III scintillation probe. Calling sites, microhabitat, movements, burrowing behavior and other activities were noted during and after P. ornata completed breeding activities. This behavioral data is being correlated with weather data, including barometric pressure, using various SAS programming techniques.

During breeding, males utilized grass clumps as major calling sites. During the day and when temperatures and humidity were too low, males burrowed into the grass clump bases, 12-18 cm below the water surface. When water temperatures dropped below 10°C, males left the ponds and burrowed at the base of vegetation clumps. Burrows up to 8 cm in depth were dug by utilizing the hind feet in Scaphiopus fashion.

The only tagged female was originally captured at the edge of the breeding pond. After tagging, this individual moved into an open field 55 m from the site. Eight days later the female returned to the pond and was observed during breeding with a non-tagged male. Immediately following egg deposition the female remained dormant for 5 days just under the leaf litter at the edge of the pond. Temperatures at this site were 6-8°C. At the end of this period the female moved back into the previously used open field where it remained for 2 months. Males remained near the breeding pond edge during this time, never venturing more than 15 m from the pond. Males were subject to high predation during this period. Specific analysis of data is presently being undertaken.

Ashton, Patricia S. - see Ashton, R.

HISTORY OF THE SOUTH AMERICAN HERPETOFAUNA: A PALEONTOLOGICAL APPROACH. Ana M. Baez, Universidad de Buenos Aires, and Zulma B. de Gasparini, Museo de La Plata, Argentina.

The Cenozoic record of amphibians and reptiles in South America is analysed. All the families recorded in the Lower Tertiary are represented in the Recent fauna, except meiolaniids and sebecids, both of which are extinct. It is evident that among them there are elements of different historical backgrounds that could have joined the South American fauna at different times. Some of those groups, such as pipids, iguanids, pelomedusids, meiolaniids, crocodylids, and perhaps leptodactylids and sebecids, also have Mesozoic records in that continent. Unfortunately most of the earliest records come from southern and eastern South America while the knowledge about the groups inhabiting the northern regions is still poor.

Prior to the connection of the Americas in Plio-Pleistocene times other families appear in the fossil

record, e.g. Testudinidae, Trionychidae, Colubridae, Emydidae?, Nettosuchidae. Except the latter, those groups may have reached the continent from the north, possibly by waif transport.

The absence of many families that comprise the Recent herpetofauna in the fossil record could indicate that they are late immigrants. Nevertheless some of them, according to their degree of endemism and phylogenetic relationships, seem to be older members of the South American fauna. Changes in the geographical distribution of the recorded taxa are considered as being related to geological events of different magnitude which provoked physiographic, and conseuently climatic and floristic changes.

LATE CENOZOIC ENVIRONMENTAL CHANGES IN PRESENT TEMPERATE SOUTH AMERICA. Ana M. Baez and Gustavo Scillato. Universidad de Buenos Aires, Argentina.

Present temperate South America extends approximately South of the Tropic of Capricorn. Besides the Andean area, several major physiographic regions can be recognized: Mesopotamia, Chaco-Pampean plains, Pre-Andean area and Patagonian plateau. By Late Tertiary their basic features were attained due to different geological events; nevertheless consideration of the environmental conditions in Pliocene times is relevant as a basis for the discussion of subsequent changes, which in many cases were gradual as the geological and paleontological data suggest.

There is no general agreement concerning the position of the Plio-Pleistocene boundary. The appearance of Nearctic mammals in South America are the paleontological criterion used. During the Pleistocene extensive areas of the Northern Hemisphere were covered with glacial ice; in the region here considered there were no glaciers extending beyond the foot of the Andes. Moreover, only south of 52°S the continental ice cap reached the present Atlantic coast. The glacial cycles of the Andean region should have affected the climatic-ecological conditions, and consequently the distribution of faunas, of the extra-andean regions. Paleozoological data, mainly from the Province of Buenos Aires (a portion of the Chaco-Pampean plains), support fluctuating climatic changes during Pleistocene and Holocene. This is based primarily on the range of variation in taxa whose ecological requirements are known. Other evidences, such as micropaleontological and sedimentological also are considered.

Baker, Wahleah - see Phillips

Baker, Wahleah - see Williams

PHOSPHATE COMPOUNDS IN REPTILIAN RED CELLS. Grant R. Bartlett,. Laboratory for Comparative Biochemistry , San Diego, California.

Interest in phosphate compounds of red blood cells has increased greatly since the discovery that 2,3-diphosphoglycerate (DPG), present in high concentration in red cells of most mammals, acts as an important regulator of oxygen transport by its strong influence on the affinity of hemoglobin for oxygen. Bird red cells contain a large amount of DPG for a brief period during embryonic development, but not after hatch, when inositol pentaphosphate (IP5), which markedly reduces the affinity of hemoglobin for oxygen, becomes a major phosphate constituent. The red cells of man, and of other mammals examined, possess no IP5. We have begun a study of the nature and amounts of phosphate compounds in reptilian red cells. The red cells of man, and of other mammals examined, possess no IP5. We have begun a study of the nature and amounts of phosphate compounds in reptilian red cells. The marine turtles, Chelonia mydas and Lepidochelys olivacea, and the land turtles, Chelydra serpentina and Chrysemys scripta, all had, in their red cells, late in embryonic development, rather large amounts of DPG, which disappeared gradually during the first year after hatch. IP5, absent in the embryo, increased slowly during the first year after hatch to substantial adult levels. The iguanas, Iguana iguana and Ctenosaura pectinata, and the snakes, Elaphe obsoleta and Boa constrictor, had no DPG in their red cells, with perhaps traces of IP5, but unusually high concentrations of ATP. Embryonic, juvenile and adult specimens of Alligator mississippiensis had no DPG or IP5 in their red cells and only low concentrations of ATP and other nucleotides. In contrast to the other reptiles, and mammals, the turtle was remarkably similar to the bird.

EVOLUTIONARY RELATIONSHIPS OF FROGS IN THE NEOTROPICAL FAMILY DENDROBATIDAE. James P. Bogart. University of Guelph.

Chromosomal information obtained from several species of dendrobatid frogs may be used to help formulate a phylogeny which is consistant with some current hypotheses based on other criteria. Colostethus and Phyllobates species possess a diploid chromosome complement of 24 which may be related to some species of the elosiine leptodactylid frogs. Dendrobates species possess diploid chromosome numbers of 20 and 18. Intrageneric variations in chromosomal morphology occur and this information may be useful to help distinguish species groupings.

DEFENSIVE BEHAVIOR IN THE PLETHODONTID SALAMANDERS PSEUDOTRITON MONTANUS AND P. RUBER. Ronald A. Brandon, George M. Labanick, Southern Illinois University at Carbondale, and James E. Huheey, University of Maryland.

Both of these brightly colored salamanders have an elaborate defensive behavior, including lateral and vertical tail displays, tail waving and coiling, head tucking and tail slapping, during which a sticky secretion is released onto the skin surface. Larger specimens tend to do more tail slapping and less posturing. Some specimens of both species, upon continuing harassment, became immobile, P. ruber in a nearly straight posture, P. m. diastictus in a tight coil. The tail displays resemble those of red efts, but in other ways defensive behaviors of these Pseudotriton and red efts differ greatly. These differences and the demonstration of skin toxicity in both forms of Pseudotriton argue against the hypothesis that brightly colored Pseudotriton are palatable, Batesian mimics of the highly toxic red efts. They seem to have some protection of their own.

Brandon, Ronald A. - see Huheey

DEVELOPMENT OF THE UROSTYLE DURING METAMORPHOSIS. Arthur E. Branham and James C. List. Ball State University.

The embryological development of the urostyle during metamorphosis (when the union and ossification of urostyle components is taking place is described in five species of frogs and toads: Leopard Frog (Rana pipiens), Chorus Frog (Pseudacris triseriata), American Toad (Bufo americanus), Gray Tree Frog (Hyla versicolor), and African Clawed Frog (Xenopus laevis). These five genera represent five levels of specialization in frogs and toads, from the primitive Xenopus to the advanced Rana. Tadpoles were reared in the laboratory, preserved at various stages of metamorphosis, and the urostyle region of representative specimens serially cross-sectioned and mounted for observation on microscopic slides. Descriptions and

comparisons of the course of development of the urostyle in these five species is presented.

SNAKE COMMUNITIES: A REVIEW WITH SUGGESTIONS FOR RESEARCH. William S. Brown, Skidmore College, New York. William S. Parker, Mississippi University for Women, Columbus, Mississippi.

Field investigations of snakes have generally focused on autecological studies of single species or, less often, on comparative interspecific ecological studies in a given locality. Few workers have been able to undertake the efforts necessary to sample snakes from habitats supporting a diverse snake community over time sufficient to generate significant input into understanding interactions between various snake species as an assemblage. Our studies at dens have afforded opportunity for seasonal captures of large numbers of individuals and have provided detailed demographic data for comparing at least three species. We here synthesize these findings with previous work with relevance to a community approach. Our review focuses on (1) the trophic niche (food overlap, prey preferences, and thermal-habitat interactions in prey selection); (2) the spatial niche (habitat selection, refuging, dispersal, and habitat conditioning; communal oviposition and overwintering); (3) the temporal niche (activity times, seasonal ingress and emergence); (4) energetics and interspecific growth rates; (5) comparative age-specific survival and reproductive rates in a snake community; and (6) species diversity in selected communities of snakes. Difficulties of capturing these cryptic vertebrates, coupled with their seemingly low population densities, have resulted in certain limitations regarding the contribution of studies of this particular group to the advancement of ecological theory. With these constraints in mind, we offer certain guarded suggestions for future studies of snakes at the community level.

Bull, James A. - see Shine

Burghardt, G. M. - see Denny

SAMPLING HERPETOLOGICAL COMMUNITIES BY A REMOVAL METHOD. R. Bruce Bury. National Fish and Wildlife Laboratory, Fort Collins, Colorado.

Extensive censuses of amphibian and reptile communities are rudimentary. Line transects alone are often poor indicators or inapplicable for measuring herpetofaunas in many habitats.

A removal technique is proposed as a useful tool to determine the species diversity, relative abundance, and estimated biomass of multi-species complexes in varied habitats. This system provides statistically sound comparisons both within and between communities, and serves as a critical indicator of situations altered by man. The removal method is efficient (2-4 days per plot) and inexpensive. It also appears to effectively sample resident populations of amphibians and reptiles.

Representative examples are provided on removal estimates for diurnal desert lizards and for amphibians in a temperate forest.

THE PHYSIOLOGICAL AND BEHAVIORAL MECHANISMS THAT RELATE TO FEEDING STRATEGIES OF REGINA SEPTEMVITTATA DURING ENVIRONMENTAL TEMPERATURE EXTREMES. Joseph A. Butler - Ohio State University. (Presented by title only)

The queen snake, Regina septemvittata, is a semi-aquatic reptile of the mid-eastern United States. It has been stated in several previous studies that this snake feeds almost exclusively on crayfish. If this is the case the snake is exposed to extremely cool water temperatures while feeding during the spring and fall.

The Galapagos marine iguana feeds in water which is below its preferred temperature. This animal meets this stress by physiologically thermoregulating by decreasing conductance below expected levels in the water. My experimentation has shown that the queen snake cannot decrease conductance appreciably while in the water.

Some fish have evolved enzyme systems which allow them to be active over wide thermal ranges. It is generally accepted that at least terrestrial reptiles have not been pressured to evolve such enzymes due to the wide variety of microhabitats available in terrestrial environments and because reptiles may behaviorally thermoregulate. My studies have shown that the enzyme myosin ATPase of R. septemvittata is most active near 28C (i.e. near eccritic and preferred temperatures of this animal). If this enzyme cannot be acclimated to function at lower temperatures (which I have not shown) the animal must be functioning in a different manner.

One possibility is that the snake feeds on more terrestrial prey during these cold periods and switches to crayfish when water temperatures are more favorable. Stomach contents are being collected and classified according to season. Results are scanty at present as more samples are needed but if there is a seasonal difference in prey taken this could explain how this snake copes with temperature extremes. If no difference is found the possibility of low temperature acclimation of the enzyme myosin ATPase must be considered.

NEW RECORDS OF COLUBRID SNAKES FROM PERU, WITH NOTES ON THEIR ECOLOGY AND DISTRIBUTION. Nelly C. de Espinoza, Museo de Historia Natural "Javier Prado", Apartado 1109, Lima, Peru.

The following 18 species of colubrid snakes are reported from Peru: Atractus occipitoalbus, Chironius cinnamomeus, C. flavolineatus, C. monticola, C. laevicolis, Dipsas indica ecuadorensis, Dryadophis danieli, Drymobius chloroticus, Drymarchon corais melanurus, Leimadophis fraseri, L. melanostigma, L. oligolepis, L. typhlus forsteri, L. triscalis, Pseudoeryx plicitalis mimeticus, Sibon nebulata leucomelas, Thamnophis proximus, and Xenodon merremii.

ANALYSIS OF THE HERPETOFAUNA OF FLORIDA LONGLEAF PINE-TURKEY OAK (SANDHILL) HABITAT. Howard W. Campbell. National Fish and Wildlife Laboratory, Gainesville, Fla.

The Sandhill habitat in Florida supports a community of 55 plus species of amphibians and reptiles, with at least 19 species of amphibians and 36 species of reptiles. Of these none are considered to be endemic to the habitat, 11 are restricted to habitats with similar physical characteristics, and the rest range throughout a variety of habitats.

Within-habitat resource partitioning is achieved through a complex of spatial and temporal utilization strategies. The composition of the community is regulated by numerous physical factors including nature of the substrate, fire frequency, ground cover and surface water distribution, as well as geologic history.

TECHNIQUES FOR HERPETOFAUNAL COMMUNITY ANALYSIS. Howard W. Campbell and Steven P. Christman. National Fish and Wildlife Laboratory, Gainesville, Fla.

Herptofaunal community analysis has been hampered by the lack of adequate sampling procedures and techniques. The great diversity of habitus, habitat and habits represented in the various groups studied by herpetologists has raised serious obstacles to the development of standard, cross and even within-group, sampling procedures. We view the development of such procedures as one of, if not the most, imperative needs

in the establishment of any effective approach to the analysis of herp communities.

We have developed a sampling approach that utilizes can traps and funnel traps placed in a "plus" shaped pattern with 18" high fences which has proven effective in a variety of habitats in Florida and could be of use in many other areas and habitats. The design was selected to maximize home range intercepts while minimizing cost of materials. A comparison with data obtained from other sampling programs in the same habitats indicates that the system is capable of providing a broad picture of the reptile and amphibian community in a relatively short period but that specialized sampling techniques are still required for certain species in any habitat.

Campbell, Howard W. - see Scott

TEMPERATE HERPETOFAUNAS: PATAGONIA. Jose M. Cei. Instituto Biologia Animal, Universidad Nacional de Cuyo, Mendoza, Argentina.

A general survey of the evolutionary development of the Tertiary Patagonian Biota is given. Paleontological and paleoclimatic evidence points out the remarkable similarity between preglacial ecological conditions of central and western Patagonian lands and both the xeric Chacoan and the humid Chilean ecosystems. The relationships between the Oligocene batrachofauna of Chubut and the present Antartandic batrachofauna are briefly analyzed. The available information on the Cenozoic reptilian fauna is reviewed, and the present composition and regional trends of the Patagonian herpetofauna are discussed.

Northern or ancient Patagonian and a southern or Deseadan major animal habitats are defined and morphologically and/or phytogeographically characterized. Fundamental herpetofaunal associations of the ancient Patagonian major animal habitat, between 38^{o} and 44^{o} South Latitude, are related to the steppe climax, to the western volcanic highlands of Neuquen, Rio Negro provinces and to the isolated basaltic Somuncura Plateau. Endemism and geographic variation of significant members of these communities are analyzed. Herpetofaunal districts of the southern Patagonian, or Deseadan major animal habitat also are recognized. They are the extensive Central highlands of Santa Cruz, the isolated volcanic Meseta near Buenos Aires Lake, the southernmost or Magellanian region of the continent and the San Jorge Gulf coastal association.

The origin and evolution of the present Patagonian herpetofauna are analyzed, and ecotonal forms and endemic forms are compared. The biogeographical patterns of northern Patagonia are pointed out, and the evolutionary importance of the extra-Andean group of primitive telmatobiine frogs is emphasized. These isolated anurans live in the western basaltic lagoons and on the Somuncura Plateau, where they are sympatric with another endemic, monotypic telmatobiine genus, which inhabits warm spring waters.

Evolutionary trends and speciation of the Patagonian genus Liolaemus are discussed. The saxicolous elongatus-kriegi group and the fossorial, psammophilous fitzingeriboulengeri group, are proposed and discussed. A kingi-archeforus group and a magellanicus group are also recognized on the basis of morphological and physiological characteristics. General conclusions on the post-Pleistocene evolutionary radiation of Patagonian lizards are presented.

ENERGETICS IN DIFFERENT LIFE HISTORIES OF AMBYSTOMA TIGRINUM. R. Christopher Chambers. Texas Tech University.

In West Texas Ambystoma tigrinum exhibits life history strategies ranging from a quickly developing aquatic larval stage culminating in metamorphosis to reproductively mature "larvae" which never metamorphose, or neotenes. Lipid deposition and depletion, reflecting energy allocation, has both an ontogenetic and seasonal component. These were isolated by sampling monthly for one year from a permanent neotenic population and from various temporary ponds which held larvae at different stages of development. Carcass and caudal lipid levels and fat body and gonadal weights were analysed separately by covariance analyses with total lean dry weight as the covariate.

Larvae initially have larger carcass lipid deposits than caudal and fat body lipid reserves. Caudal levels surpass carcass deposits before metamorphosis with fat body weight negatively correlated with ovarian weight. All components show significant positive correlation with body size. Immatures from the neotenic population show a similar ontogentic pattern.

Mature neotenes exhibit greater variation in caudal than carcass deposits with an increased lipid level in April and May. Both lipid compartments show a positive relationship with body size; females possessing more body lipid than males. Ovarian weight, the most labile component, shows negative correlation with fat body weight and positive correlation with body size prior to oviposition in November.

Significantly higher lipid levels in the neotenic population reflect higher prey densities in the permanent pond. In all populations selection favors rapid growth and gonadal development. Egg laying before metamorphosis increases fecundity. High lipid deposition rates and paedogenesis increase fitness by allowing flexibility in life history patterns.

Christman, Stephen P. - see Campbell

THE HERPETOFAUNA OF FLORIDA SAND-PINE SCRUB. Steven P. Christman. National Fish and Wildlife Laboratory, Gainesville.

The unique Sand-pine scrub habitat is endemic to Florida and is rapidly disappearing. Although the habitat includes no permanent fresh water, species diversity of terrestrial reptiles may be higher in scrub than any other habitat in Florida. Over 40 species of amphibians and reptiles have been recorded from scrub and at least two are essentially restricted to it. Species diversity and species assemblages appear to change with scrub maturity. Sand-pine scrub is maintained by periodic fire, without which succession to hammock would occur resulting in extirpation of much of the highly-adapted scrub fauna.

Colbert, Sylvia - see Ralin

CINEMATOGRAPHIC TECHNIQUES IN HERPETOLOGICAL EDUCATION. Alan D. Collier. Miami University, Hamilton, Ohio.

Struck by the lack of good herptile films useful for general zoology classrooms (excluding National Geographic televised specials), an attempt was made to formulate a filmed introduction to herptile behavior suitable for wide-range use.

The feeding behavior of selected reptiles and amphibians was chosen because it is the most active and easily photographed behavior. The herptiles filmed were selected on the basis of availability and subsequent film results, also for their general audience recognition.

Attempts were made to document anecdotal reports and explore heretofore unresearched herptiles. Also, behavior that might have been disturbing to viewers was eliminated as not to detract from its educational value.

The finished product is now being used in zoology classes at Miami University's Hamilton Campus. A

second, more detailed film suitable for more advanced classes is now underway.

VARIATION OF DIEL ACTIVITY OF A CHIHUAHUAN DESERT LIZARD COMMUNITY. F. Michael Creusere and Walter G. Whitford. New Mexico State University, Las Cruces, New Mexico.

The diel activity of the ten species that make up a Chihuahuan Desert lizard community can be divided into four main patterns: (a) unimodal throughout most of the day; (b) unimodal for a brief period only, usually morning; (c) bimodal, but with emphasis on early morning activity and (d) true bimodal activity. Species packing in this community was examined on the basis of temporal patterns of activity and microhabitat use.

Lincoln Index population estimates for Cnemidophorus tigris and Holbrookia (Cophosaurus) texana usually indicated densities 3X to 4X that observed at any point in time. Both species were continuously active throughout the day. However, individuals were not necessarily active throughout the day. Most had well defined activity periods occurring in five patterns: (a) early morning activity only; (b) mid-day activity only; (c) late afternoon activity only; (d) both early morning and late afternoon activity and (e) activity throughout the day. Those individuals active at mid-day were usually large males restricted to narrow, arroyo sub-habitats. Females of both species ceased activity from two to six weeks, moving from the population to lay eggs in other habitats.

Small males and some females of most species had their activity restricted to subhabitats not used by the population as a whole and had more restricted activity periods. In all species variability in activity pattern of both sexes was related to the breadth of activity for the species i.e. in species with restricted activity patterns individual variation was small.

THE SIGNIFICANCE OF REPRODUCTIVE ECOLOGY IN FROGS AND ITS RELEVANCE TO THE STUDY OF ANURAN COMMUNITIES. Martha L. Crump. University of Florida, Gainesville, Florida.

The following aspects are important components of anuran community ecology: (1) species diversity (both richness and equitability components), (2) resource utilization (niche breadth calculations of at least the three basic niche dimensions--food, space, and time), (3) community stability (extent of fluctuation of the component population sizes and an analysis of the factors controlling population levels), and (4) interactions of the members of the community (extent to which species limit each others' activities).

Species that depend upon standing bodies of water for reproduction frequently migrate to breeding sites. This results in mixed-species assemblages different from the communities during the non-reproductive periods. In addition, larval communities are entirely independent of the adult communities. Therefore, it is necessary to analyze the four aspects mentioned above for all three types of communities. This "poly-community" phenomenon has an effect on population fluctuations of frog species and on their resultant intra-community interactions. The other components of the community (prey and predators of frogs) are likewise affected by this extremely dynamic system.

It is during the breeding period when most potential species interactions would be expected to occur and when competition for limited resources would be at a maximum. The obvious question is "How can such a high number of species coexist in a restricted area?" Analysis of behavioral isolating mechanisms and resource utilization provide answers in terms of species-specific requirements.

Reproductive strategies have a profound effect on community stability and species diversity. In aseasonal environments where reproduction is continuous, clutch sizes are smaller, but more clutches are produced per year. The result is a buffering against adult population fluctuations, yielding greater community stability and a potential for increased species diversity. Aquatic larval communities are generally characterized by highly fluctuating population sizes due to catastrophic and unpredictable phenomena (such as the evaporation of the site) and high predation pressures. Age-specific mortality (especially high at gastrulation, hatching, and metamorphosis) has obvious significance to community stability.

Another important aspect of reproductive strategy is mode of reproduction (combination of ovoposition site and type of development). An increase in the diversity of reproductive modes results in greater resource partitioning. A world-wide survey of reproductive modes reveals a greater diversity in aseasonal environments than in seasonal environments. Areas high in species richness exhibit a concomitant high diversity of reproductive modes. Mode of reproduction has obvious implications to genetic variability of a population. The most generalized species (those depositing eggs directly in water) breed in the most unpredictable environment and produce the largest clutch-sizes--and therefore exhibit the greatest potential for high genetic variability.

Crump, Martha L. - see Kaplan

AGGRESSIVE BEHAVIOR IN THE GREEN SALAMANDER, ANEIDES AENEUS. Paul V. Cupp, Jr. Eastern Kentucky University.

During June-July, 1976, aggressive interactions were observed between male green salamanders, Aneides aeneus, when single males were introduced into a test chamber already inhabited by a resident male. Of 49 such introductions, 45 resulted in aggressive encounters after which one of the males would retreat. Resident males were usually the aggressors and were victors in 43 of the 45 aggressive encounters. Introduced males returned the aggression in only 11 instances and were victors in only two of the encounters. An aggressive encounter usually consisted of the aggressor rapidly biting and/or vigorously pressing his snout along the back of the other male. In six encounters, prolonged bite-holds were observed in which the jaws of one male would grip the mid-body region or a limb of the other male. These data indicate that A. aeneus is territorial, which may result from competition for favorable rock crevices. Also, this behavior may enhance the chances of a resident male having a successful reproductive effort.

EFFECT OF TONGUE REMOVAL ON THE FEEDING BEHAVIOR OF AN ADULT GARTER SNAKE THAMNOPHIS SIRTALIS. W. D. Denny, G. M. Burghardt, and R. P. Saunders. University of Tennessee.

In two experiments, we attempted to assess the relative importance of the vomeronasal and olfactory systems in garter snakes. Snakes used were an adult T. sirtalis sirtalis which had its tongue surgically removed as an adult several years previously, and three normal T. sirtalis controls. In Experiment 1, the tongueless animal and a control were placed separately for a number of trials in a chamber in which the odor of the nightcrawler Lumbricus terrestris was then introduced. Snakes were then allowed access to Lumbricus pieces. The unusual feeding behavior of the tongueless snake, which consisted of lunging around the cage with mouth wide open, a pattern not seen in any of the control animals, seemed to disrupt the normal

feeding sequence of stalk and attack. We attributed this animal's bizarre feeding behaviors, which seemed to be triggered by the odor of the prey items, to its tonguelessness. In Experiment 2, the tongueless animal and 3 controls were presented with prey items, first with no extra prey odor present and second with odor introduced. All three controls showed decreased latencies when the prey odor was introduced while the tongueless snake showed an increase in latency. Results suggest that the loss of the tongue decreased the ability of this snake to locate prey in an ambiguous olfactory situation.

REPRODUCTIVE CYCLE AND FEEDING BEHAVIOUR OF CUPRIGUANUS ACHALENSIS (SAURIA IGUANIDAE). di Tada, Ismael; R. Martori; B. Kufner y A. Ocana; Centro de Zoologia Aplicada, Universidad de Cordoba, Argentina. (Presented by title only)

Cupriguanus achalensis is the only lizard that lives in Pampa de Achala (elev. 2,200 mts.), an extra cordilleran relict in Sierras Grandes System, Province of Cordoba, Argentine.

Based on field observation a population of Cupriguanus achalensis was studied during the active period of the specie from September to April.

The reproductive cycle presents the following seasonal variations: espermiogenesis begins in September and spermatozoa are present in October and November, in this period copulation occurs. The size and weight of testes decease in December and January, and increase at the end of the summer or beginning of autumn.

Egg development begins in October and laying occurs in January. Hatchings were found from December to January, a year after deposition.

The daily feeding activity is resumed in a simple model. Cupriguanus achalensis is a generalist and he behaves as predator and a primary consumer. Activity begins when the sustratum temperature reaches 22C.

This specie uses a passive strategy (sit and wait) to capture arthropods and active (search) to eat vegetals. The ingestion sequence of an arthropod and other, and an arthropod and a vegetal indicate a predation preference.

These data are correlated with climatic phenomena and food disponibility.

ORIGIN AND DISTRIBUTION OF REPTILES OF LOWLAND TROPICAL RAINFORESTS OF SOUTH AMERICA. James R. Dixon.

Of the 203 reptile genera occurring in South America, approximately 175 (86%) appear to have their origin on that continent, and of the 175, 72 (41%) appear to have evolved within lowland rainforest situations.

Of approximately 1,100 species of South American reptiles, 550 (50%) occur within the boundaries of lowland (- 1000m) tropical rainforests that comprise about 42% of the standing vegetation of South America. Of the 550 reptile species, about 300 (54%) are endemic to the forests and 74% of all South American reptile genera are involved in the forests to some degree.

The South American rainforests have contracted and expanded through the Pleistocene glacial and interglacial periods, often being connected by a series of rainforest corridors of various dimensions, allowing for repeated dispersal of Amazonian reptiles into the Atlantic and Choco forests. There appears to be little migration from the latter into the Amazon forest. The Atlantic and Amazon forests have been most frequently in contact with each other, while the orogeny of the Andes in the Pliocene effectively restricted movements of Amazonian reptiles into the Choco forest.

Prior to the orogeny of the Andes, there appear to have been widespread tropical conditions that allowed aquatic reptiles (crocodiles, turtles,Dracaena) to become well established over much of the area. However, later climatic and geologic events caused extinction of several aquatic species, as evidenced by fossil lowland rainforest species at relatively high (2000m) elevations.

The life style of the modern reptiles of the lowland tropical rainforests is primarily terrestrial (43%), followed by arboreal (26%) fossorial (21%) and aquatic (10%). Many of the terrestrial forms occupy open, semiopen and/or modified forest zones. Some of the latter are surviving relics from Savannah formations of glacial periods, some are perianthropic and the remainder generalists. Only a few species of Andean genera have successfully invaded the lowland tropical rainforests.

As one would expect, the Choco Forest reptile fauna is closely allied to the fauna of Central America while the Atlantic reptile fauna shows less endemism, fewer species and a close affinity to the Amazon Forest fauna.

Though the theory of lowland tropical rainforest refugia during glacial maxima may explain the occurrence of endemism through isolation, the high number of endemic fossorial forms of reptiles may have evolved through changes in edaphic and climatic factors, independent of forest refugia. This may also explain the low number of endemic aquatic reptiles.

Dole, Jim W.--see Durant.

INTEGUMENTARY STRUCTURES CORRELATED WITH URICOTELY IN AN AFRICAN TREEFROG. Drewes, R. C., (California Academy of Sciences), S. S. Hillman, (University of California, Riverside), R. W. Putnam, (UCLA), and O. M. Sokol, (Stanford University).

Uricotely, low evaporative water loss, and high rates of water uptake through the ventral surface have been demonstrated in Chiromantis petersi Boul., an African rhacophorid treefrog (Drewes, et al., in press), placing the species on a par with its congener, C. xerampelina, and with the South American hylid, Phyllomedusa sauvagei Boul. Detailed examination of the anatomy of the integument of C. petersi and comparison with skin samples taken from some 60 other frog species reveal a unique arrangement of chromatophore units in the dermis which appears to be correlated with low EWL and high rates of water uptake.

THE ACOUSTICAL NICHE: AUDITORY RESOURCE PARTITIONING IN ANURAN COMMUNITIES. William E. Duellman. University of Kansas.

Frogs have a limited vocal repertoire; yet within any given multispecies breeding congregation each species has a distinctive call. Moreover, in different habitats or in geographically distant areas similar kinds of calls are produced by different species of frogs. Calls of 39 species of hylid frogs from three widely separated areas (Puerto Viejo, Costa Rica; Belem, Brasil; and Santa Cecilia, Ecuador) were analyzed for seven parameters: 1) number of notes per call group, 2) note repetition rate, 3) number of secondary notes, 4) duration of note, 5) pulse rate, 6) fundamental frequency, and 7) dominant frequency. Cluster analysis revealed that those species having the most similar calls are members of either widely separated geographic communities or different ecological communities within a given area. Discriminant function analyses of individual breeding congregations revealed that 100 percent discrimination is accomplished by utilizing only two or three parameters of the calls. These results suggest that the acoustical parameters of anuran breeding congregations can be viewed as ecological resources in which there is no overlap in utilization within a breeding congregation. Thus, distinctive acoustical niches are evident within anuran communities, and allopatric species fill equivalent niches in different communities.

ORIGIN, EVOLUTION AND DISPERSAL OF THE ANDEAN HERPETOFAUNA. William E. Duellman. University of Kansas.

The herpetofauna of the high Andes consists of two major assemblages. The southern assemblage occurs principally to the south of the Huancabamba Depression in northern Peru. Within this assemblage two groups can be recognized: 1) A Patagonian element of recent invaders of the Andes (Pleurodema, Bufo, Ctenoblepharis, Liolaemus, Phymaturus, Pristidactylus, and Tachymenis), none of which extends north of the Huancabamba Depression; and 2) A mid-Andean element composed of Telmatobius and Stenocercus (both extending north of the Huancabamba Depression) and Batrachophrynus (central Peru). The northern assemblage is composed of three groups: 1) A major northern Andean element made up of Bolitoglossa, Eleutherodactylus, Atelopus, Osornophryne, Colostethus, Cryptobatrachus, Hyla, Centrolenella, Phenacosaurus, Anadia, and Pholidobolus, none of which occurs to the south of the Huancabamba Depression, plus Phrynopus, Gastrotheca, and Proctoporus, all of which occur to the north and south of the Huancabamba Depression. 2) A derived element in the Merida Andes sharing Bolitoglossa, Eleutherodactylus, Atelopus, Colostethus, Hyla, Centrolenella, and Anadia with the northern Andes in Colombia. 3) A partly shared and partly independently derived fauna in the Sierra Nevada de Santa Marta with the endemic Geobatrachus, species of Eleutherodactylus mostly related to species in the Cordillera de la Costa in Venezuela, and three genera (Bolitoglossa, Atelopus, and Cryptobatrachus) shared with the main northern Andes. The members of the northern assemblage are either congeneric with species in the adjacent humid tropical lowlands or are derived from lowland groups.

The herpetofaunas on the humid slopes of the Andes are composed of many endemic species and some endemic genera (Amblyphrynus, Rhamphophryne, Amphignathodon, Centrolene) that are related to taxa in the humid tropical lowlands and related or not to taxa in the high Andes.

The diversity of the Andean herpetofauna is due to: 1) Independent invasions of the Andes by numerous ancestral stocks, and 2) Geographic isolation through expansion and contraction of habitats correlated with altitudinal climatic shifts during the Quaternary. The major physical barriers to distribution are the low depressions--Huancabamba Depression in northern Peru and the Cucuta Depression at the Colombian-Venezuelan frontier. A second factor contributing to broad distributional patterns is the change from an aseasonal humid climate in the north to a seasonal semi-arid climate in the south.

Duellman, William E.--see Pefaur.

ECOLOGICAL DISTRIBUTION OF THE SALIENTIAN FAUNA OF THE MERIDA ANDES, VENEZUELA. Pedro Durant. Universidad de Los Andes, Venezuela.

From August 1970 to October 1971, the main natural areas of the State of Merida were covered in a collecting program along five transects through the western side of the Andes. The areas were selected according to the life zone systems of Tamayo and Holdridge. Each one of the samples collected was identified to species and most of the morphological analysis was done on living material. The distribution of the representative groups of Salientia from these censuses was related to changes in the biophysical conditions from the Parmo or Sub-Alpine life zone to the Tropical wet forest life zone.

About 50% of the 30 genera, and 28% of the 110 species of Salientia in Venezuela are represented in the Merida Andes. The most representative genera are : Hyla (28.4%), Colostethus (18.0%), and Leptodactylus (14.3%). The tropical wet forest harbored about 39.2% of the species collected, and the Paramo only 10.7%. Some species such as C. meridensis and Eleutherodactylus williamsi, seem to be restricted to very specific habitats (Pre-Montane Pluvial Forest and Low Montane Wet Forest, respectively). Others such as Bufo marinus, H. crepitans, and L. podicipinus have wide distribution in most of the life zones of the State of Merida.

AMPHIBIAN ECOLOGY OF THE VENEZUELAN ANDES. Pedro Durant (Universidad de Los Andes, Merida - Venezuela) and Jim W. Dole. (California State University, Northridge).

Some of the biophysical conditions as they change from the Paramo, or Subalpine life zone (3850 m. high, 3-6C biotemperature and 780 mm. rain fall) to the tropical wet forest life zone (62-150 m. high, 28-30^{o}C biotemperature and 3900 mm. rain fall) are discussed. In these environments 50% of the amphibian genera, and 28% of the frog species of Venezuela belong to the Merida Andes alone. Some species (Colostethus meridensis, Eleutherodactylus williamsi, etc.) seem to be restricted to very specific habitats, while others (Bufo marinus, Hyla crepitans, Leptodactylus podicipinus, etc.) are widespread in most of the Andes life zones.

The reproductive cycles and growth of B. marinus and H. crepitans at the xerophytic life zone of the Merida Andes were studied. The supposed nutritional value of some microorganisms found in the gut, the apparent physiological differences in the intestine regions, and the space that the tadpoles of these species occupy in the same pond, all suggest the development of an ecological mechanism in these frogs which allows them to grow in the same body of water while avoiding inter-specific competition effects.

Growth, home range, movements, reproductive activity, seasonal changes in the population structure, significance of food source and differences in the stomach contents before and during breeding season are discussed for Atelopus oxyrhynchus in a Venezuelan cloud forest.

A COMPARISON OF THERMAL TIME CONSTANT OF AQUATIC AND TERRESTRIAL TURTLES. Vickie Earnhart and E. Norbert Smith. Northeastern Oklahoma State University, Tahlequah, Oklahoma.

This study is a review of the literature dealing with turtle thermoregulation. Published heating and cooling rates were compared using thermal time constants and corrected to zero air speed. Data were collected on 9 species of turtles, 5 aquatic and 4 terrestrial.

Regression formulas were then used to calculate weight specific thermal time constants during heating and cooling in each group. For a theoretical aquatic turtle, in air, the warming time constant ranged from16.9 to 203 min. for 0.1 - 10 kg turtles respectively. The cooling time constant went from 24.31 to 174 min. for 0.1 - 10 kg turtles, respectively. For theoretical aquatic turtles in water the warming constant went from 3.2 to 38.4 min. for 0.1 - 10 kg, respectively.

For theoretical terrestrial turtles, (in air) the warming time constant ranged from 23.0 - 375.9 min. for 0.1 - 10 kg turtle, respectively. The cooling time constant ranged from 20.1 - 373.0 min. for a 0.1 - 10 kg turtle.

The ratio of the warming time constant to the cooling time constant (T_W/T_C) was also calculated for each group. For the aquatic turtles in air the ratio went from 0.70 - 1.17 min. for 0.1 - 10 kg, respectively.

The ratio in the terrestrial turtles in air went from 1.15 - 1.01 min. for 0.1 - 10 kg, respectively.

The above observations indicate a profound difference in the heating and cooling response of aquatic and terrestrial turtles. Larger aquatic animals heat much faster than they cool. Large terrestrial turtles cool faster than they heat.

A ZOOGEOGRAPHIC ANALYSIS OF THE HERPETOFAUNA OF THE WEST INDIES. Arthur C. Echternacht. The University of Tennessee - Knoxville.

A quantitative analysis of the herpetofauna of the West Indies is presented. The emphasis is on the relationship between species diversity and area. Sixty-eight islands and their banks are considered. Banks and islands are analyzed separately, as are amphibians and reptiles, and lizards and snakes. Diversity is, in some cases, more closely correlated with bank area than with island area. Amphibian (anuran) and lizard diversity are related to island (or bank) area, whereas snake diversity is related to both area and to diversity of the other groups. This is not unexpected inasmuch as many West Indian snakes prey primarily on other poikilothermic vertebrates.

TERRESTRIAL LOCOMOTION IN SALAMANDERS: GAIT ANALYSIS. James L. Edwards, Michigan State University.

Single-frame motion picture analysis of representatives of the families Ambystomatidae, Dicamptodontidae, Salamandridae and Plethodontidae revealed that all salamanders progress through a typical sequence of gaits. At the slowest speeds, salamanders use a gait previously unreported in vertebrates, in which each limb is in contact with the ground for at least 90% of the stride duration. At faster speeds, the animals switch to lateral sequence, diagonal couplet walks, and then to trots. At the fastest speeds, salamanders abandon their limbs entirely, and "swim" across the substrate in a type of locomotion I call fast lateral undulation. Although any individual will follow the above sequence of gaits, the exact speed at which an individual will switch from one gait to another varies considerably from one locomotor sequence to the next; however, elongate salamanders usually switch to the next fastest gait at lower speeds than more robust forms. Salamanders use only about one-fourth of all terrestrial gaits found by Hildebrand in other vertebrates.

Use of the "walk pattern analysis" of Dagg and de Vos allowed the clustering of salamander gaits into seven similarity groups, which represent "comfortable" locomotor patterns used by large numbers of salamanders. The groups were linked by means of a Prim network to predict how any individual would move from one similarity group to another.

PARTITIONING OF FOOD RESOURCES IN SNAKES OF THE UNIVERSITY OF KANSAS NATURAL HISTORY RESERVATION. Henry S. Fitch. University of Kansas.

Fifteen species of snakes are present on the 239 ha reservation in population densities ranging from 1800 per ha in Diadophis punctatus to less than one per 100 ha in Elaphe guttata. These species differ greatly in size, seasonal schedule, habitat, and their terrestrial. fossorial, arboreal or aquatic adaptations. More than 2500 separate food items have been recorded from snakes on the area. A wide range of prey species are taken, and each species of snake overlaps others in some degree, but in no two does the diet have exactly the same composition. Major food resources are earthworms (mainly Allolobophora caliginosa), voles (mainly Microtus ochrogaster) and frogs (mainly Rana blairi). In all instances of two snake species preferring the same kind of prey, resource partitioning can be shown in: 1) partial habitat separation, or 2) sizes of individual prey items taken, or both.

STRUCTURE AND FUNCTION OF ANOLE DEWLAPS. Henry S. Fitch and Virginia R. Fitch. University of Kansas, Lawrence.

In male lizards of the genus Anolis the dewlap is a highly developed display organ. The species-specific bobbing displays serve varied functions including species recognition, sex recognition, courtship, and maintenance of territory. Females of most species lack dewlaps although their chins may show traces of dewlap color; some have small dewlaps, and a few have them well developed. In the males, size, shape, color, markings and patterns of allometric growth are distinctive of species; squamation is especially complex and varied. Dewlaps having diverse scale patterns are illustrated. Like the display for which it serves, the dewlap itself provides characters that may be indicative of degree of relationship between species. However, except for general color, dewlap characters have not yet been utilized in classification.

Fitch, Virginia - see Fitch, H.

THE HERPETOFAUNA OF THE NOTHOFAGUS FORESTS OF SOUTHERN CHILE. Ramon Formas C., Instituto de Zoologia, Universidad Austral de Chile, Casilla 567, Valdivia, Chile.

The herpetofauna of the austral Nothofagus forests is very poor in species but contains many endemic amphibians (Caudiverbera, Telmatobufo, Hylorina, Batrachyla, Rhinoderma, Eupsophus, Insuetophrynus) There are no endemic genera of reptiles. The fauna is composed of some Tertiary anuran elements and of others that migrated into the region (among them some other amphibians and all of the reptiles). The migrant fauna is Patagonian and Andean in origin. Pleistocene glaciation resulted in modifications of distributions. In post-Pleistocene times the Nothofagus forest and its herpetofauna reached more northerly latitudes than at present. There are still some small relictual patches of forest (Valparaiso) where disjunct populations of southern anurans (Batrachyla, Rhinoderma) dwell. The geographic isolation of the Nothofagus forest possibly has permitted intense speciation, especially among the migrant elements.

COMPOSITION, DISTRIBUTION AND ORIGIN OF THE CHACOAN HERPETOFAUNA. Jose M. Gallardo.

The Chacoan herpetofauna occupies the northern part of the Chaco-Bonariensean Plateau having an elevation of 100-500 m. Below 100 m there is a transition to the Litoral-Mesopotamian fauna; above 500 m there is a transition to the Subandean fauna. In this area there is a rainfall gradient generally coinciding with the topography. The vegetation principally is a Chacoan park type with monte and isolated trees interspersed in grassland; thorn bushes or halophytic vegetation sometimes are present. The existence of rivers influence the faunistic distributions.

The herpetofauna is composed of five families of amphibians, six of lizards, five of snakes, one of turtles, and one of crocodilians. There is a total of 46 genera and 63 species. The amphibians and to a lesser degree the lizards have a parallel origin with the Litoral-Mesopotamian fauna. Both apparently originated from the same Guayana-Brasilian stock, which differentiated later through isolation and reinvasion of some areas. The view fits the refugia theory for survival during unfavorable climatic periods with subsequent reinvasion of areas when favorable climates returned. River systems have been fundamental to the

distribution of amphibians. Snakes have a broader distribution and in general do not follow the patterns of amphibians and lizards. Turtles and crocodilians reach farthest west through the rivers; their distributions tend to coincide with those of the fish fauna. The Chacoan herpetofauna seems to have originated from the Parana River fauna, which in the past extended to the west, where it subsequently adapted to the more rigorous climatic conditions. Among the species of the Chacoan herpetofauna are several that show reproductive, dietary and/or ethological adaptations denoting their adjustment to the conditions present on the Chaco-Bonariensean Plateau.

Gasparini, Zulma - see Baez

SAMPLE SIZE IN TAXONOMIC ELECTROPHORETIC STUDIES - AN EMPIRICAL ANALYSIS. George C. Gorman, U.C.L.A.

Electrophoretic studies have been used primarily in the analyses of questions related to population genetics. Large sample sizes for such studies are clearly requisite. A carry-over from this approach is that workers assume that sample sizes of 20-30 or more individuals are desirable if not necessary when one is using electrophoresis primarily for taxonomic analyses. Theory suggests otherwise. Dr. M. Nei and co-workers have pointed out that increasing the number of loci sampled is far more important than increasing the number of individuals sampled for a taxonomic comparison.

Empirical analysis of previous studies on the relationships of insular Anolis lizards supports theory rather convincingly. Genetic distance estimates are remarkably insensitive to sample size for number of individuals. A randomly chosen individual from the population will often be sufficient. The error in genetic distance estimates is far greater by decreasing the number of loci sampled, than by decreasing the number of individuals sampled.

Even heterozygosity estimates are relatively insensitive to sample size. Ten individuals appears to be sufficient for most purposes. Even two individuals ususally gives the correct "ballpark" estimate.

THE ECOLOGY OF THE SPECTACLED CAIMAN IN THE VENEZUELAN GUAYANA. *S. J. Gorzula. I.V.I.C. - Caracas 101, Venezuela.

For three years a population of spectacled caimans, Caimancrocodilus crocodilus, has been studied using mark and recapture techniques. The caimans occur in a savanna lagoon system that consists of 4 permanent and 9 temporary lagoons. During the dry season the lagoons cover 2.28 hectares, and during the rainy season 23.32 hectares.

Migration to temporary lagoons occurs in the rainy season. Such migrations occur on nights when it is raining, and the caimans frequently return to the permanent lagoons on the same night. Caimans, displaced from their lagoons, will home up to 2 km.

A growth curve was made from the data of 36 recaptured caimans. It was estimated that in this area caimans take 6 years to reach a total length of 97 cms. Thereafter the growth rate varies from year to year. During a dry year there may be no growth at all, and during a wet year a large caiman may increase in length by up to 10 cms.

During the first two years of life, the young caimans stay near the site of the nest, and eat terrestrial insects. Older caimans eat insects during the dry season, but during the rainy season migrate to temporary lagoons and eat frogs. Although there are 26 species of frogs that breed in the area, only three species--Bufo granulosus, Elachistocleis ovalis, and Pleuroderma brachyops--were found in the stomach contents of the caimans.

*This work was financed by CONICIT S1-0168. VENEZUELA

BEHAVIOR, ECOLOGY, AND THE ADAPTIVE ZONE OF AFRICAN MOLE VIPERS (ATRACTASPIS). Harry W. Greene. University of Tennessee, Knoxville.

Morphological and biochemical studies by others suggest that mole vipers are related to aparallactine colubrids and not viperids. I will summarize literature records, stomach analyses, and observations on captive A. bibronii and A. microlepidota. Defensive behavior is similar to that of many other small, secretive snakes and includes head hiding, neck arching, body flattening, tail display, body snapping, cloacal discharge, biting, and immobility. Prey killing behavior is unusual and differs from viperids in at least two respects: (i) one fang is used, and the strike is a posterior and/or lateral head movement (rather than a forward movement with two fangs); (ii) single and multiple rodent prey are struck repeatedly before ingestion of any one item begins (rather than a single strike at one item prior to ingesting it). Data are available on 75 prey items in 45 specimens of four species. One snake had eaten an anuran and one contained 12 reptile eggs. Thirty-one specimens contained 1-2 reptiles per stomach ($\bar{x}$=1.13); 11 specimens contained 1-4 mammals per stomach ($\bar{x}$=2.45) Eighteen of 27 mammals (67%) appeared to be nestlings; 9 of 11 stomachs with mammals (82%) had multiple prey. The peculiar prey killing behavior and unusual cranial modifications of Atractaspis are perhaps adaptations for (i) delivery of a venomous bite to a potentially dangerous prey in a confined space and (ii) rapidly immobilizing several prey items (some of which might otherwise escape) prior to ingesting them. (Supported by the Theodore Roosevelt Memorial Fund, the Karl P. Schmidt Fund, and NSF BNS 76-19903).

Guerrero, S. - see Andrews

QUATERNARY BIOGEOGRAPHY OF TROPICAL LOWLAND SOUTH AMERICA. Jurgen Haffer.

Climatic-vegetational fluctuations in the neotropical lowlands during the Quaternary caused vast changes in the distribution of forest and nonforest biota. Comparatively restricted populations of plants and animals probably were isolated and deviated in remnant habitat areas ('refugia') during adverse climatic periods, often reaching the level of new subspecies or species before they established secondary contact with other refuge populations during expansive phases under a favorable climate. Numerous species probably became extinct during the Pleistocene vegetational fluctuations, probably leading to the elimination of entire evolutionary lines.

Results of recent biogeographical studies on neotropical birds, lizards, butterflies, and plants of forest habitats support the refuge theory. A total of about 40 forest refugia have been proposed in Middle and South America, a larger number for plants and insects than for vertebrates. This difference may reflect different survival ability of these groups of organisms in refugia of varying size. Quaternary vegetational fluctuations probably also determined the evolution of nonforest faunas at the level of subspecies and species. Additional direct evidence for the location of Quaternary forest and nonforest refugia based on eomorphological, pedological, and palynological data is needed to substantiate the above conclusions which are largely derived from biogeographical interpretations.

A REVIEW OF STRUCTURING IN HERPETOLOGICAL COMMUNITIES. Harold Heatwole. University of New England, New South Wales, Australia.

A literature review of the structuring of herpetological communites is presented. Structuring is examined from several viewpoints:

1. Numbers of species and individuals in different communities as related to environmental and vegetational features;
2. biomass;
3. spatial relations - relation to environmental geometry and to habitat selection; and
4. community interactions.

Hillman, S. S. - see Drewes

CALL DIFFERENCES AND CALLING SITE SEGREGATION IN ANURAN SPECIES FROM CENTRAL AMAZONIAN FLOATING MEADOWS. Walter Hodl. Zool. Inst. d. Univ. Wien, Austria.

The acoustic behavior of 15 sympatric and synchronically breeding species of frogs in an area of floating meadows near Manaus, Brazil was studied for a period of 8 months. The calling positions of each species can be identified with certain physiognomic types of vegetation.

Sound analyses were used to compare the mating calls. The main variables are dominant frequency, call duration and pulse repetition rate. Each of the 15 species has a distinct mating call and differs from the acoustic behavior of each other one. Eleven species are separated in their dominant frequency ranges within their specific calling sites. Species sharing emphasized frequency ranges within identical calling sites differ greatly in at least two temporal variables.

The roles of calling position, spectral, and temporal features of mating calls in species recognition and premating reproductive isolation are discussed.

DISTRESS CALLS IN CENTRAL AMAZONIAN FROGS. Walter Hodl. Zool. Inst. d. Univ. Wien, Austria.

Distress calls of Hyla lanciformis and H. Boans (juvenile and adult), Leptodactylus ocellatus, L. pentadactylus and Hydrolaetare sp. (adult) are presented in oscillograms and sonagrams. The calls are species-specific, yet showing striking similarities in spectral patterns. A possible protective and communicative function of this call type is discussed.

THE HERPETOFAUNA OF GUIANA, AN APPRAISAL OF OUR CURRENT KNOWLEDGE. Marinus S. Hoogmoed. Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands.

The Guiana region (bordered by the Orinoco, Cassiquiare Canal, Rio Negro, Amazon and Atlantic Ocean) geologically is one of the oldest regions of South America. The greater part is formed by the pre-Cambrian Guiana-shield, Roraima sandstone covers parts of southern Venezuela and western Guyana, with isolated remnants in central Guyana and central Surinam. The overall elevation of the area does not exceed 1000 m, but the sandstone remnants may reach heights of about 3000 m. Because of their isolated position and their releatively high elevation, these mountains (tepui's) represent subtropical islands in a tropical lowland sea. The total number of reptiles and amphibians known to occur in Guiana at present is 394, of which 162 are amphibians, 232 reptiles. These numbers comprise five sea turtles, one cosmopolitan gecko and five species imported from the Caribbean. The remainder can be assigned to five major groups: endemics; amazonian; widespread; reaching eastern limit of distribution in this area; species reaching Guiana from S. and C. Brazil. Of amphibians 81, of reptiles 64 species are restricted to the Guiana region, or occur only slightly over the borders of the area delimited. The species in the other groups may form endemic subspecies in the area (34 subspecies belonging to 27 species). Most endemics are concentrated in the western part of Guiana, and can be divided into "lowland" and "altitudinal" endemics, the latter exclusively occurring over 1000 m. About 28% of amphibian and 16% of reptile endemics are altitudinal. Endemic altitudinal genera like Otophryne and Oreophrynella seem to represent relics from the early Tertiary, Stefania seems to represent a recent radiation, the position of Riolama is not very clear. The remaining endemic genera (Allophryne, Rhinatrema, Peltocephalus, Amapasaurus) are lowland endemics and their history is not very clear. Endemic species of Elosia and Euparkerella point to relations with SE Brazilian highlands. Most altitudinal endemic species are subtropical derivatives of lower living relatives. The origin of most of the lowland endemics probably is related to the history of the postulated Guiana forest refuge during Quaternary climatic changes. Major geographic barriers are absent for lowland species and differential distribution in most cases probably is due to ecological competition or special habitat requirements. Altitudinal endemics have restricted distributions on one or a few neighbouring tepui's.

NOVEL TOXINS AND THE QUESTION OF WARNING COLORATION AND MIMICRY IN SALAMANDERS. James E. Huheey, University of Maryland, College Park, MD, and Ronald A. Brandon, Southern Illinois University at Carbondale, Carbondale, IL.

It has long been known tht red efts and other American salamandrids are protected by the potent low-molecular weight neurotoxin, tetrodotoxin (TTX). We here report the presence of a second, high-molecular toxin in the skin of Notopthalmus and Taricha which can be distinguished from TTX by its pharmacological and chemical properties. Furthermore, a high-molecular weight, non-TTX poison has been isolated from the skin of salamanders of the genus Pseudotriton. In LD_{50} mouse bioassays (intraperitoneal injection), pseudotritontoxin has comparable toxicity to TTX on a per salamander basis. The finding of these novel toxins requires that the mimetic relationship of these forms, usually considered to be Batesian, be re-examined.

Huheey, James E. - see Brandon

DIFFERENTIATION IN THE GENERA ENYALIUS AND STROBILURUS (IGUANIDAE): IMPLICATIONS FOR PLEISTOCENE CLIMATIC CHANGES IN EASTERN BRAZIL. James F. Jackson University of Southwestern Louisiana.

Geographic variation in meristic and morphometric characters are examined to delimit the taxa of the forest-restricted genus Enyalius in eastern Brazil. Eight taxa are recognized. Phenetic affinities among these are described by multiple discriminant analysis and Wagner networks based on separate morphological data sets. A phylogeny is proposed, and a sequence of allopatric differentiations is hypothesized. The locations of refugia of the Brazilian Atlantic forest during drier climatic periods are hypothesized from present variation in vegetation and precipitation: Santa Catarina refuge, around Baias de Paranagua and Sao Francisco and adjacent slopes of Serra do Mar; Sao Paulo refuge, Serra do Mar between Paranapiacaba and Sao Sebastiao; Bocaina refuge, around Baia da Ilha Grande; Mantiqueira refuge, on Serra da Mantiqueira; Orgaos refuge, on Serra dos Orgaos; Southern Espirito Santo refuge, in the mountains south of Rio Doce; Northern Espirito Santo refuge, on the Coastal plain north of Rio Doce; Salvador refuge, around Baia de Todos os Santos; Pernambuco refuge, along coast of northern Alagoas and southern Pernambuco; Upper Rio Doce refuge, near the headwaters in Minas Gerais. Locations of the hypothesized refugia are compared with the geographical separations in Enyalius proposed to have preceded

differentiation. Differentiation in Enyalius is most interpretable with reference to past forest refugia separated by corridors of open vegetation. Geographic variation in Strobilurus torquatus in northeastern Brazil requires similar conclusions.

THE TAXONOMIC STATUS OF DESMOGNATHUS WELTERI BARBOUR AND A COMPARISON WITH TWO SYMPATRIC CONGENERS. J. Eric Juterbock. Ohio State University.

Abundant morphological and life history evidence exists that Desmognathus welteri Barbour is a full and distinct species and not a giant subspecies of D. fuscus. D. welteri is sympatric throughout its range with both D. fuscus and D. monticola and is more aquatic than either congener. Larvae of D. welteri are larger at hatching than those of either D. fuscus or D. monitcola and maintain this difference throughout larval life. They transform 21-24 months after hatching unlike those of either congener, both of which have larvae which transform no later than nine months after hatching. Adults of D. fuscus are significantly smaller than those of D. welteri and D. monticola. D. welteri and D. monticola have very different types of jaw teeth and patterns of replacement; D. fuscus resembles D. welteri in both regards. All three species have different tail shapes. Color patterns, though variable, show definite patterns of interspecific variation which are characterized. A brief review is made of interspecific differences reported elsewhere for related characters. The known range of D. welteri is described.

THE NON-COST OF BROODING IN AMBYSTOMA OPACUM. Robert H. Kaplan, Brooklyn College of the City University of New York and Martha L. Crump, University of Florida.

Brooding behavior in salamanders ranges from a weak bond between the parent and offspring (mere presence of parent at the egg deposition site) to active defense of the clutch and transporting of the eggs to a more favorable site. From theoretical literature we reason that brooding behavior would not evolve if the cost to the overall fitness of the parent exceeds the benefit. This cost is measured as a decrease in the future reproductive success of the parent. The cost could be generated by energy drains on the brooding parent due to the physical nature of the behavior itself and/or the relatively lower feeding rate which may be associated with the behavior.

Ambystoma opacum is the only member of a primarily aquatic-breeding genus of salamanders that remains with its eggs after terrestrial deposition. In order to determine the energetic cost of this "parental investment," we compared dry weight, total calories, weight-specific caloric content, and ash content in females that had just begun to brood with those near completion of brooding. Differences in these four variables between the two groups are not significant at $P \leq 0.05$. The argument that brooding females are at an energetic disadvantage because they are unable to forage is discarded because the males collected from the area during the same time period also had empty stomachs and intestines. We therefore suggest that there is no increase in energetic cost due to brooding in A. opacum.

DIFFERENTIATION AND HYBRIDIZATION IN THE NATRIX FASCIATA COMPLEX (REPTILIA: SERPENTES): A NONMORPHOLOGICAL APPROACH. Howard I. Kochman. National Fish and Wildlife Laboratory.

Reproductive interactions among freshwater and coastal populations of Natrix fasciata were evaluated on the basis of osmoregulatory criteria. Putative hybrids between water snakes of the fasciata and clarki groups were collected from a brackish creek along the Atlantic coast of central Florida. Captive-born juveniles, as well as snakes collected wild at this site, were experimentally subjected to full-strength seawater for a maximum duration of 20 days. Variational patterns of survival time and dehydration rate suggest secondary intergradation among highly differentiated, though reproductively compatible taxa.

Within populations, body weight correlates negatively with dehydration rate and positively with salinity tolerance. The fact that neonatal N. f. clarki averaged over 38% heavier than N. f. pictiventris may therefore represent a strategy to reduce the osmotic stress of juveniles in saline habitats. The characteristic salinity tolerance of salt marsh snakes. however, is primarily a function of weight-independent strategies, involving low rates of dehydration and an inherent reluctance to ingest seawater.

Kufner, B. - see DiTada

Labanick, George M. - see Brandon

HERPETOFAUNAL RELATIONSHIPS OF SOUTH AMERICA WITH AFRICA. Raymond F. Laurent.

At first sight, the contrast between the Neotropical and Ethiopian herpetofaunas is so striking that it seems to fit the Matthewsian or Darlingtonian zoogeographic theories (vicariance of the Ranidae with the Leptodactylidae, Agamidae with the Iguanidae, etc). However, the plate tectonics proved such theories to be incorrect. Some recent paleontological discoveries indeed confirm that Africa and South America were united until almost the end of the Mesozoic. Of those preatlantic groups, only a few are now surviving as such: the Gymnophiona as a whole, the Pipidae, the Pelomedusidae, the Gekkonidae as a whole, the Amphisbaenidae, the Leptotyphlopidae, and probably the Typhlopidae. Many are extinct, for example the Mesosuchians, and many other Mesozoic reptiles. The Leiopelmatidae were present in Jurassic times in South America and presumably in Africa as well. A less old wave probably is represented by the Myobatrachidae which also became extinct there except for Heleophryne in Africa and those that evolved into Leptodactylids and Ranoids. The Geotrypetes - Apodops group survived in Africa while the Ichthyophiidae did so only in the Neotropical Realm. Some groups apparently managed to migrate from one continent to the other before the final split. The Bufonidae and the Iguanidae did it from west to east while the Microhylids travelled in the opposite direction. The Iguanidae reached Madagascar where they survived but they did not in Africa.

Some other groups had a similar opportunity but failed to establish themselves on the other continent probably because they prohibit mutual ecological occurrence. The sister groups leptodactylids and ranids are a typical case.

For many millions of years after its birth the Atlantic Ocean was a narrow sea and therefore not a major barrier against rafting dispersal. Kluge demonstrated such crossings as recent as Pliocene or Pleistocene for the Hemidactylus mabouia brooki complex. Quite reasonably, many groups might have been successful in a similar feat during earlier periods. Especially for the Gekkoninae several waves might be considered. In general, the rafting from South America to Africa seems to be a dubious and unusual event (Typhlopidae, Natricidae), whereas the African invaders of South America seem to have been considerably more frequent--not only the Gekkoninae, but also the skinks (Mabuya) and the Gavialidae which died out there afterwards, perhaps also some amphisbaenians and Typhlopidae, the Lycodontinae and the Colubridae (sensu Underwood).

Some groups apparently came from elsewhere in both continents according a Matthewsian or Darlingtonian scheme; these include the Testudinidae, Crocodylidae, Elapidae, and possibly the Lycodontinae, Boiginae, Natricidae and Colubridae.

A round-about Odyssey through northern continents in fundamented for the Ranidae with Rana palmipes as a rather agressive pioneer. An inverse course is quite unlikely but seems a remote possibility for the Boiginae, which are numerous in South America (Leptodeira, etc.) and so far made a modest inroad in Africa (Telescopus).

However, the most numerous groups evolved on only one side of the Atlantic and failed to colonize the other continent. Examples are the Dermophiinae, Caecilidae (sensu stricto) Typhlonectidae, the already-mentioned Leptodactylidae, the Hylidae, Centrolenidae, Pseudidae, Dendrobatidae, Teiidae, Anguidae, Boini, Dipsadinae, Xenodontinae, Crotalinae for South America; the Scolecomorphidae, Herpelinae, Ranidae (except for Rana palmipes), Hyperoliidae, Agamidae, Chamaeleonidae, Lacertidae, Cordylidae, Varanidae, Pythoninae, Dasypeltinae and Viperinae for Africa. A temporary inroad before the Turonian severance or a short-lived beach head on either side are distinct possibilities which paleontological discoveries in Cretaceous and Paleocene beds on the critical coast zones of both continents might substantiate.

THE HERPETOFAUNA OF THE LLANOS AND ASSOCIATED NON-FOREST REGIONS OF NORTHERN SOUTH AMERICA. Juan R. Leon. Escuela de Ciencias Universidad de Oriente, Cumana, Venezuela, S.A.

Considering the great number of species and diversity of South American neotropical amphibians and reptiles, a discussion restricted to llanos species deals with only a tiny fraction of the entire herpetofauna. Since different authors in this symposium will be dealing with other major areas, a good amount of knowledge on the origin, evolution, dispersal and complexity of the neotropical amphibians and reptiles can be gained.

The northern South American flat lands (llanos) mostly occur in Colombia and Venezuela east of Andes, where they range from 0 to 500 meters above sea level. Geologically, the origin and existence of these llanos can be traced back to Plio-Pleistocene. The actual composition and distribution of the herpetofauna of this area is explained as a function of the recent origin, and the climatic, topographic and ecological changes that have taken place subsequently. These changes are thought to have altered the amount of precipitation inducing a relative aridity to this landscape.

The amphibians and reptiles of the llanos of Colombia and Venezuela are presented together with a brief review of adjacent areas like the Caribbean scrub. In general, the herpetofauna of the South American llanos is impoverished considering its relative land extension. Actually, there is not a typical herpetofauna inhabiting the llanos, probably as a result of recent dispersion of faunal elements into this area coming in from adjacent regions, mostly from Amazonian forests, perhaps as a consequence of a high level of adaptation of animals to the arid climatic conditions. On the basis of these two points of view different aspects of the llanos herpetofauna are discussed.

BIOGEOGRAPHY OF THE AMPHIBIANS IN THE ORIENTAL REGION OF THE GUIANAS. Lescure, Jean. Museum National d'Histoire Naturelle, Paris, France.

NO ABSTRACT RECEIVED.

TRACKING AS AN AID IN THE STUDY OF SNAKE COMMUNITIES. Harvey B. Lillywhite. The University of Kansas, Lawrence, Kansas.

Snakes weighing as little as two grams leave identifiable impressions when crawling over finely textured soil surfaces. Dirt roads, dune habitats, and surfaces prepared by scraping or brushing of topsoil have been used as trackways in ecological studies of snake communities in southern California chaparral and desert. Preliminary data point to the usefulness of snake tracks in determining behavioral density, spatial relationships, social behavior, and species composition within communities. In a montane chaparral community it was possible to discriminate reliably among tracks made by the three common species, Crotalus viridis, Pituophis melanoleucus, and Masticophis lateralis. In desert sand environment, individual sidewinder rattlesnakes, Crotalus cerastes, have been followed for distances exceeding 1.8 Km. Data for snake activity in chaparral point to the difficulties of estimating accurately the absolute densities of snake populations by any presently accepted method.

List, James C. - see Branham

REFUGIA, REFUGES AND MINIMUM CRITICAL SIZE:PROBLEMS IN THE CONSERVATION OF THE NEOTROPICAL HERPETOFAUNA. Thomas E. Lovejoy. World Wildlife Fund-U.S., Washington, D. C.

As the face of South America changes steps must be taken to set aside refuges in which the continent's herpetofauna can survive. Contours of endemism as in Pleistocene refugia constitute one means of identifying areas for conservation priority. Contours of species diversity represent another approach. The merits of the two will be discussed. Also, refuges must be above a minimum critical size to retain species over long periods of time. Aspects of this problem will be discussed, as will emerging results on reptiles as contrasted to data available on birds.

THE AMPHIBIANS OF THE LOWLAND TROPICAL FORESTS OF SOUTH AMERICA. John D. Lynch. The University of Nebraska-Lincoln, Lincoln, Nebraska.

The lowland tropical forests (rainforests Auct., below 1000 m) of South America exist as four units: the Trans-andean forests (Choco, Nechi, and Magdalena), the Northern forests (Santa Marta, Maracaibo Basin, and coastal Venezuela), the Central cis-andean forests (Amazonia or Hylaea Auct.), and the Atlantic forests (eastern and southeastern Brasil). These four forests harbor 530 species of amphibians belonging to 13 families (one salamander, three caecilians, and nine anurans).

Endemicity is pronounced; only 26 species (4.9 %) are shared by two or more forests. The Northern forests are most depauperate (39 species) and least distinct (56 % endemicity). The Atlantic forests harbor 183 species (92 % endemic), the Central forests 225 (90 % endemic) and the Trans-andean forests 126 (88 % endemic).

Hylid frogs are dominant in all four forests (Atlantic 38 %, Central cis-andean 37 %, Northern 28 %, and Trans-andean 22 %) as are leptodactylid frogs (Atlantic 37 %, Central cis-andean 24 %, Northern 26 %, and Trans-andean 25 %). The leptodactylids of the Central, Northern, and Trans-andean forests are essentially eleutherodactylines and leptodactylines whereas those of the Atlantic forests are primarily elosiines, grypiscines, leptodactylines, and odontophrynines. Dendrobatid frogs are prominent components of Central, Northern, and Trans-andean forests but essentially absent in Atlantic forests.

Four areas of marked endemism are apparent:(1)the South American Choco, (2) the upper Amazon Basin (Napo-Ucayali drainages), (3) the Guyanas, and (4) coastal Brazil (Rio de Janeiro - Sao Paulo area). Forty-four per cent (233) of all forest dwelling species of South American Amphibia are restricted to these four forest areas.

Many amphibian groups and genera exhibit distributional patterns congruent with Haffer's forest refugia model. Such a model, consisting of waves of advances and retreats of forests, could be used to account for some of the high species densities observed in some groups.

However, amphibians are poorly represented in some of the proposed refugia or core areas. The poor representation may reflect profound differences between forests mediated by seasonality of rainfall. Unlike amniotes or aquatic vertebrates, most amphibians attempt to be terrestrial without the amniote water-conserving mechanisms. The lack of such mechanisms is most apparent in the reproductive strategies of the amphibians.

The high species densities (and endemicities) of Amphibia correlate well with areas of high aseasonal rainfall. In forested regions, such rainfall provides high humidity microhabitats of long duration necessary for the most fragile reproductive modes employed by amphibians (direct development, terrestrial eggs and larvae). Such environments do not of necessity reduce the success of more pedestrian reproductive modes (eggs and larvae in water).

The importance of reproductive mode in providing constraints to or enhancement of dispersal of forest amphibians is demonstrated by observing that a greater proportion of mode 1 and mode 5 species are non-endemic than might be predicted and that fewer mode 6 and mode 8 species are non-endemic than might be predicted if non-endemicity and reproductive mode are not related. If the sensitivity to seasonality of rainfall is an appropriate index to forest fidelity, then groups exhibiting the more sensitive reproductive modes become of importance in drawing inferences about past climates and biogeographic events. The groups exhibiting sensitive reproductive modes include bolitoglossine salamanders and dendrobatid and eleutherodactyline frogs. The two groups of frogs are autochthonous South American forest elements most dominant in the northern forests of South America. In each case, their ancestry may be traced to the forests of southeastern Brasil. The Brasilian groups are in turn derived from leptodactyloid groups in the Austral forest of Patagonia.

Martori, R. - see DiTada

UTILIZATION OF CAVE RESOURCES BY A LIZARD COMMUNITY. William J. Mautz. Cornell University, Ithaca, New York.

A community of three lizard species exploits the resources of a system of caves at Puerto Marquez, Guerrero, Mexico. The caves provide a stable, low temperature, high humidity environment with variable and sparse food resources. Anolis taylori (Iguanidae), Phyllodactylus lanei (Gekkonidae), and Lepidophyma smithi (Xantusiidae) differ in the degree to which they utilize the cave resources. These differences are apparent in activity pattern, body temperature, evaporative water loss, and diet. Specializations for cavernicolous life involve absence of a diel activity cycle, absence of thermo-regulatory activity, low resistence to water loss, and a generalized diet that includes decaying fruit and probably carrion.

Maxson, Linda R. - see Wake

Mecham, John S. - see Sattler

THE ENERGETIC BASIS OF SOCIAL BEHAVIOR: LIZARD SOCIAL STRUCTURES. George Middendorf III and Wilfred M. Post III. Graduate Program in Ecology, University of Tennessee.

The mechanisms controlling the specific social structures exhibited by various vertebrate populations are as yet unknown. Although some suggestions have been made of environmental or genetic causality, most investigators have been content to label the social structure as to general type. Investigations of lizards have often contained reports of their social structure; several different types have been reported. These reports are examined for iguanid lizards and other vertebrates where appropriate. Specific attention is paid to environmental conditions of the population under study. From this examination an energetic-based model is proposed in which both population density and resource abundance are seen as crucial factors. Social structures, particularly territoriality and social hierarchy, once thought dichotomous, are seen as points on a spectrum of social hierarchy to social aggregation. These structures replace one another depending upon the environmental conditions. While the concept of a social structure reflecting the environmental conditions is not new, the concept of an energetic-based spectrum of structures reflecting these conditions is. Such a formulation suggests that studies of social behavior should, in addition to examining type and variation of structure, consider the energetic cost to the animals, the associated gain, and, most importantly, consider the structure in relation to the ecological conditions. Until an approach of this sort is used, studies of social structure will remain only descriptive. The social behavior of the iguanid lizard Sceloporus jarrovi is currently being examined utilizing this approach. (Funded by NSF-DEB 76-16841).

ACTIVITY METABOLISM IN THE MUDPUPPY, NECTURUS MACULOSUS. Kirk Miller. Department of Zoology, University of Oklahoma.

Routine and sustained activity metabolism were investigated in Necturus maculosus acclimated at 5°C or 15°C and an LD 12:12 photoperiod. Mudpuppies exhibited significant daily cycles in oxygen consumption and spontaneous locomotor activity at both acclimation temperatures. The majority of the increment of oxygen consumption during periods of high spontaneous activity was due to air breathing. Routine whole body lactate levels did not vary with acclimation temperature or time of day.

Animals from both acclimation temperatures were electrically stimulated to maximum activity for 30 min (complete exhaustion) at two times of day. Animals stimulated to maximum activity during periods of high spontaneous levels and depended entirely on anaerobiosis for extra energy production. Animals stimulated to maximum activity during periods of low spontaneous activity increased oxygen consumption by air breathing but derived the majority of the increase in energy production anaerobically.

Whole body lactate production during maximum activity was independent of acclimation temperature and independent of the level of spontaneous activity at the time of stimulation. Whole body lactate levels remained high for more than 10 h following stimulation but returned to resting levels within 24 h. Salamanders may excrete lactate into the medium but no lactate was found in bladder urine.

Mudpuppies routinely produce 50 - 75% of their energy aerobically, during stimulated maximum activity, however, 67 - 75% of total energy produced is derived anaerobically.

McNulty, John A. - see Schwalm

COMPARISON OF "NATURALISTIC" AND QUADRAT APPROACHES IN THE ANALYSIS OF A BRAZILIAN FROG COMMUNITY. Craig Nelson. Indiana University, Bloomington, Indiana.

Approximately 60 species of anurans occur at the Boraceia Biological Station of the Sao Paulo Museum of Zoology in southeastern Brazil. Three techniques were used for analyzing the habitat differences among the more ubiquitous members of this community. In the first, or "naturalistic", numerous records of site of capture of each species are compared with gross habitat divisions of the station (forest, scrub, meadow, pondside, streamside, etc.). In the second random quadrats were searched. In the third, quadrats were non-randomly placed. In the latter two cases a number of physical and biotic parameters were measured, and weighted and unweighted "niche" breadth and overlap were calculated.

AMPHIBIAN COMMUNITIES IN SOUTHERN INDIANA: FACTORS INFLUENCING SPECIES COMPOSITION IN PONDS. Craig Nelson. Indiana University, Bloomington, Indiana.

Laboratory and field data combined with speculation suggest that three major processes are important in determining the species composition of amphibian communites at individual ponds in southern Indiana. A primary factor is the relative permanence of the pond which largely determines the types, if any, of aquatic vertebrate predators which overwinter in the pond. The nature of the predators in turn is a strong influence on egg and larval survival of spring breeding forms. In several cases it appears that some species are maintained by a stochastic process including escape from predators in good years and nearly complete mortality in other years. Finally, habitat selection and competition among cogeners influence the pool of species available in particular habitats.

Ocand, A. - see DiTada

TEMPERATURE INDUCED ANOMALIES IN NATRIX FASCIATA. David Wm. Osgood. Butler University. (Presented by title only)

Thirty-four litters of the banded water snake, Natrix fasciata, were incubated under controlled, constant-temperature conditions. The 754 young snakes from these litters were compared with a control group of 20 broods (384 snakes) taken from females caught shortly prior to littering. Of 1,138 young snakes examined, 33 were grossly abnormal in external morphology. The various anomalies can be classified into general groups (shortening of the axial skeleton, bending of the vertebral column, cleft palate, microphthalmia, and reversal of subcaudal scales). Some types of abnormalities were positively correlated with high (30C) and others with low (21C) developmental temperature. The frequency of anomalies was lowest in the 26C treatment group. The incidence of abnormalities in both the 21C and 30C treatment groups was more than twice that of the controls or 26C sample.

Packard, Gary C. - see Packard, M.

Packard, Gary C. and Mary C. - see Tracy

Parker, William S. - see Brown

SCANNING ELECTRON MICROSCOPY OF EGGS OF SQUAMATA. Mary J. Packard, C. Richard Tracy, and Gary C. Packard. Colorado State University, Fort Collins.

Light microscopy in conjunction with scanning electron microscopy has been used to study the morphology and ultrastructure of "parchment-shelled" eggs from a number of species of Squamata. Shells from eggs fixed in formalin at the time of oviposition and shells from eggs incubated to hatching were examined. In general, "parchment-shelled" eggs are composed of several layers of fibers with a calcareous (=crystalline) layer forming the outermost surface. Both the fibrous layers and the calcareous layer vary in structure and thickness from species to species. The continuity of the crystalline layer is often broken by cracks or fissures which presumably provide for the exchange of respiratory gases with the environment, as well as for the uptake of liquid water from the substate.

COMMUNITY STRUCTURE IN HIGH ANDEAN HERPETOFAUNAS. Jaime E. Pefaur and William E. Duellman. University of Kansas.

Density, diversity, niche breadth and niche overlap were analyzed for amphibians and reptiles in 10 study sites above tree line in the Andes. Two to eight species were found at each site; a total of 1373 specimens of 33 specimens was studied.

Values for speices diverity of the entire herpetofauna show no clear latitudinal trends; there is a significant trend for increasing species diversity in reptiles from equatorial to temperate sites, but there is a comparatively higher diversity in amphibians in the equatorial sites. Two niche dimensions were analyzed fully -- structural habitat and food. Niche breadth values for structural habitat are slightly higher in reptiles than in amphibians. Niche breadth values for food are inverse. Overall niche breadth is higher in amphibians than in reptiles, the former being more generalists than the latter. Niche overlap for structural habitat is higher than for food. Overlap values between any species of pairs in the same community are generally low, with the exception of some pairs of amphibians in which values are relatively high. However, there is no consistent difference in values within and between communities. Unexpectably, niche overlap increases with decreasing species richness and species diversity.

Penna V. Mario - see Veloso

A PRELIMINARY STUDY OF SKIN SURFACE SCULPTURING IN TOADS. David Pettus and Tyler A. Woolley. Colorado State University, Ft. Collins, Colorado.

Specimens from three species of toads (Bufo boreas, B. terrestris and B. woodhousei) were studied by scanning electron microscopy. Skins from four regions of the body were examined at relatively low magnifications (65X and 300X). Surface sculpturing showed considerable variation between regions as well as between species. Well developed channels were present on all species and most regions. The pattern of channels is more reticulate on the ventral and lateral surfaces and more parallel on the dorsum. The skin of B. terrestris is more rugose and spinose than that of the other two species. Too few specimens were used to permit definitive conclusions, but the technique appears promising in working out the adaptive significance of the differences between species.

EFFECTS OF DNA BIOSYNTHETIC INHIBITORS ON BULLFROG TADPOLES DURING THYROID HORMONE INDUCED METAMORPHOSIS. Robert Phillips, James Williams, Wahleah Baker, and Gary VanDenbos. Northeastern Oklahoma State University, Tahlequah, Oklahoma.

The nature of the control mechanisms regulating cell growth and replication in eukaryotic organisms is an active area of research. The anuran system, Rana catesbeiana, provides an interesting animal model for a

number of reasons, especially: a). their existence for extended periods of time in the larval (tadpole) state, and b). the ability to induce metamorphosis precociously with thyroid hormone (TH).

The morphological and biochemical transition which takes place during the metamorphosis climax are interesting from the standpoint of their rapidity and efficiency, and pose the question: to what extent are the developing tissues (ie. limbs, lungs) dependent on pre-formed moelcular components from regressing tissue (ie. tail, gills)?

We are investigating this question by comparing the morphological and biochemical effects of drugs, which inhibit DNA synthesis by blocking specific metabolic steps in the precursor-to-DNA pathway, on TH treated and control tadpoles. One of these drugs, 5-fluorodeoxyuridine is used as a human chemotheraputic agent. The extent to which the dose sensitivity of tadpoles reflects that used to regulate cell proliferation will also be discussed.

This study was supported by NIH grant 1-SO6-RR-08123.

Phillips, Robert - see Williams

ACTIVITY, HABITAT, AND POPULATION STRUCTURE IN THE TURTLE, TRIONYX MUTICUS. Michael V. Plummer. Harding College.

A riverine population of Trionyx muticus was studied for 3 years by capture-mark-recapture. These turtles were most active from May through September. Trapping success was affected by changes in water level, and a midsummer period of inactivity was associated with low, stable water levels and high water temperatures. Males preferred areas with emergent sandbars but females preferred deeper, more open water except during the nesting season when they moved into shallow water adjacent to sandbars. Deviations from parity in sex ratios were attributed to biases in sampling. About 82% of the male population and 25% of the female population was mature. There was a high degree of mobility within and between local subsets of the population; discrete populational boundaries were not observed. Approximately 1900 turtles were estimated to be within a 1.5 km section of river. However, direct counts of all individuals present were not feasible even for small areas, and indices based on capture-mark-recapture were biased by temporary emigration and immigration.

Post, Wilfred M. III - see Middendorf

Putnam, R. W. - see Drewes

MORPHOLOGICAL VARIATION IN A DIPLOID-TETRAPLOID SPECIES COMPLEX OF TREEFROGS. Ralin, Dennis B., James S. Rogers, and Sylvia Colbert. Kentucky State University, University of New Orleans, Kentucky State University.

A multiple discriminant analysis of 13 external morphological measurements was made on diploid (Hyla chrysoscelis) and tetraploid (H. versicolor) populations. Eastern populations of H. chrysoscelis (South Carolina, Georgia, Ohio, Mississippi) clearly separate from western (south-central Texas) populations when plotted on the first two DF axes. Populations of H. vericolor occupy intermediate positions, but are not very distinct from the eastern diploid populations.

A bivariate plot of the same populations, utilizing indices based on two qualitative characteristics used to define the three formerly described subspecies, shows a similar pattern. Eastern diploid populations plot in the upper right-hand portion of the graph, because most or all individuals have a reticulate pattern on the posterior border of the thighs (1.0) and noticeable webbing between the fingers (1.0). Western diploid populations plot in the lower left-hand portion of the graph, because most or all individuals lack the above characters (0.0, 0.0).

The morphological analyses are consistent with non-morphological data indicating an intermediate origin of H. versicolor, involving two groups of diploid populations. The range of the former subspecies H. v. sandersi corresponds well with that of the western diploid populations. The range of H. v. chrysoscelis (type locality Dallas, Texas) probably included diploid intergrades in north-central Texas and extreme eastern Texas-Louisiana, as well as southern tetraploid populations. The former subspecies H. v. versicolor probably included most eastern diploid populations and northeastern tetraploid populations.

Rand, A. Stanley - see Andrews

USE OF A MAMMALIAN RESOURCE BY A CHIHUAHUAN SNAKE COMMUNITY. Robert Reynolds. University of New Mexico, Albuquerque, New Mexico.

During the summers of 1975-1976 I studied the snake and rodent communities northeast of Chihuahua city. This region is desert scrub with Larrea, Flourensia, Parthenium and Prosopis the characteristic genera.

Snakes were collected along an 80.5 km stretch of route 16. Examination of capture sites for the plant species present, structural characteristics of the vegetation and topographic features showed that snake species exhibited distinct habitat preferences. Rodent species present and their relative densities were assessed by 4500 trap nights at 15 trap stations. Twelve species of rodents were recorded.

Digestive tracts of 274 snakes of 16 species were examined and yielded 121 food items. Rodents comprised 60.68% of the diet by frequency of occurrence, with birds, reptiles, amphibians and arthropods accounting for the remainder. The frequency of occurrence of the rodent species in the snake diets is closely related to their relative densities found by trapping.

The size of the prey was roughly proportional to the size of the predator. Arena experiments in which prey were introduced to a predator show that snakes are selecting prey items on the basis of size and probably not on species. Small snakes selected smaller rodents, whereas large snakes took larger rodents and ignored the smallest species.

The coexistence of the snakes is probably due to differences in the habitat preferences of the snakes and rodents, and is also the result of size differences within and between predator species. Each predator species of a given size class takes a different size class of prey.

Rodulfo, Felicia C. - see Acuna

Rogers, James S. - see Ralin

DISTRIBUTION PATTERNS, CLADISTIC PATTERNS, PALEOGEOGRAPHY, AND BIOTIC HISTORY. Rosen, Donn E. American Museum of Natural History, New York, N.Y.

No ABSTRACT RECEIVED.

Ross, John - see Stewart

COMPARATIVE CRANIAL OSTEOLOGY OF FARANCIA AND PSEUDOERYX: SYSTEMATIC IMPLICATIONS. Douglas A. Rossman, Louisiana State Univ., and David L. Cundall, Lehigh Univ.

Neill (1964) united the montypic North American xenodontine snake genera Abastor and Farancia, and he postulated that Farancia erytrogramma and F. abacura shared a common ancestor with Pseudoeryx plicatilis of

South America. Our examination of approximately 90 skull characters supports the congeneric relationship between the rainbow snake (F. erytrogramma) and the mud snake (F. abacura), but it fails to confirm a close affinity between Farancia and Pseudoeryx. The two genera exhibit their greatest differences in the nasal and orbital regions of the skull. The similarities between Farancia and Pseudoeryx in external features probably can be attributed to convergence. Many skull characters exhibit considerable intraspecific variation, which underscores the need to examine series when conducting osteological studies.

HYBRIDIZATION IN SPADEFOOT TOADS. Paul W. Sattler and John S. Mecham. Texas Tech University.

Hybridization and introgression between Scaphiopus bombifrons and S. hammondi are being investigated with the use of seven electrophoretic species-specific markers. Field studies have demonstrated that significant numbers of hybrids and backcross progeny occur throughout the wide area of sympatry. Experimental laboratory crosses have been made in order to more precisely measure levels of fertility of various hybrid products. Analysis of laboratory hybrids has shown that all but one of the protein markers are inherited codomonately, and so may be used to differentiate between hybrids and offspring from backcrosses. Further, the large number of markers permits identification of the parental species involved in the backcross. Preliminary data does not suggest the occurrence of differential introgression between the two species.

Saunders, R. P. - see Denny

THE ELABORATION OF VENOM DELIVERY SYSTEMS IN SNAKES. Alan H. Savitzky. National Museum of Natural History.

Systems for the injection of venom under pressure through tubular fangs have been developed in at least five lineages of colubroid snakes. Three of these culminated in proteroglyphous taxa, two in solenoglyphous ones. Despite numerous differences between these groups, sufficient similarities exist to recognize common responses to adaptive and mechanical problems. Four components of the venom delivery system may be recognized: venom, fangs, storage lumina, and gland-deforming muscles. Although each of the five proteroglyphous and solenoglyphous groups has developed all four components, other taxa exhibit different combinations of them. Examination of these forms suggests the sequence of modifications leading to fully elaborated systems. Functional coordination among the components of well-developed venom delivery systems enhances the likelihood of convergence in independent lineages of many structural details, including features not immediately related to feeding activities. Although selection favors gradual improvement in the venom delivery apparatus, full attainment of the front-fanged condition consititutes a major adaptive step.

COMPARISON OF CHROMATOPHORE ULTRASTRUCTURE IN NEOTROPICAL HYLID AND CENTROLENID FROGS. Patricia A. Schwalm (University of Chicago) and John A. McNulty (Stritch School of Medicine, Loyola University).

Chromatophore ultrastructure in the infrared-reflecting glass-frog Centrolenella fleischmanni (family Centrolenidae) was found to differ markedly from that of other arboreal green frogs (family Hylidae). Four types of pigment cells are found in the dermis of C. fleischmanni: two correspond in structure to typical hylid xanthophores and iridiophores, one is similar to the unusual melanophores of phyllomedusine hylids (which also reflect infrared light) and one chromatophore type is unlike any cell previously described. A major difference in organization of pigment cells is apparent. The dermis is not primarily composed of discrete groups of chromatophores in associations resembling the hylid dermal chromatophore unit. Instead, flat xanthophores form a continuous sheet just under the basement lamina. This layer is occasionally interrupted by groups of iridiophores that break up the green ground color as a series of light spots. The stellate processes of the new pigment cell also form a continous layer, generally subjacent to other chromatophore types. Pigment granules in the new cell are moderately electron-dense and have an irregular shape that suggests a fluid composition. Melanophores are too few and widely spaced to contribute significantly to the overall appearance of C. fleischmanni. Melanosomes have a fibrous appearance but are smaller and lack the electron-dense inner core of the phyllomedusine melanosomes they resemble.

Implications of chromatophore ultrastructure are discussed in terms of systematics and development.

Scitallo Y., Gustavo - see Baez

SEASONAL SHIFT IN THE TEMPERATURE PREFERENDUM OF THE WANDERING GARTER SNAKE. John R. Scott. Colorado State University, Fort Collins, Colorado.

A constant temperature thermal gradient was used to evaluate preferred body temperatures of spring and fall specimens of Thamnophis elegans vagrans (Baird and Girard) from a montane habitat. Spring animals, which were overwintered at 4°C in the laboratory, maintained significantly higher cloacal temperatures over a 2 day period than animals collected and tested in the fall. Voluntary hypothermia in the fall should be adaptive in that cool retreats (hibernacula) are sought which protect against early winter storms. Hyperthermia in the spring may enhance reproduction and digestion.

THE HERPETOFAUNA OF FOREST LITTER PLOTS FROM CAMEROON. Norman J. Scott, Jr. National Fish and Wildlife Laboratory, Albuquerque, New Mexico.

Systematic samples of African forest litter herpetofaunas were made in Cameroon, Africa. The African faunas are compared with faunas from similar tropical forests of Asia and Central America. Data compared include total species, distribution of individuals among species, and the taxonomic make-up of the samples.

Of special interest are the African samples that were taken from a forest established on a white sand soil. This type of system is generally supposed to be much less productive than tropical forests growing on other types of soils.

THE STATUS OF STUDIES OF HERPETOLOGICAL COMMUNITIES AND SUGGESTIONS FOR FUTURE RESEARCH. Norman J. Scott, Jr., (address above) and Howard W. Campbell, National Fish and Wildlife Laboratory, Gainesville, Fla.

Historical trends in the study of herpetological communities are summarized. Contributions from this session are considered to represent the present "state of the art."

General goals are defined as perceived in these studies and recommendations are made for ways in which these goals can be furthered. Additional ways of looking at herpetological communities are suggested.

LOW FREQUENCIES OF REPRODUCTION IN ITEROPAROUS ORGANISMS. Richard Shine and James J. Bull. University of Utah.

Most vertebrates reproduce every year after maturing, but some, mainly poikilotherms, reproduce at

lower frequencies. Reproducing every second year, or less often, is known in a variety of salamanders, frogs, snakes, lizards, turtles and fish. A simple mathematical model suggests that low reproductive frequencies are at a selective advantage over high frequencies if reproducing entails a large fecundity-independent cost. A large fecundity-independent cost means that even a small clutch entails a high cost (in energy and survivorship) to the reproducing animal. Breeding migrations, territory defense, nest-building and brooding are examples of activities where the costs are largely independent of the number of offspring produced. We make three predictions from this model: (1) species with low reproductive frequencies should show obvious high fecundity-independent costs; (2) within a species, the sex with the highest fecundity-independent cost should show the lowest reproductive frequency; and (3) within a species, the lowest reproductive frequency should be found in the poorest-quality habitat. The data support these predictions.

QUATERNARY BIOGEOGRAPHY OF THE SOUTH AMERICAN HIGHLANDS. Beryl B. Simpson. Smithsonian Institution, Washington, D. C.

The major highland areas of South America include the complex Andean Cordillera, the Pantepui Highlands and the mountains of southeastern Brazil. Quaternary climatic events affected these highlands differently because of their varying ages, elevations and latitudinal positions. The Andean Cordillera which spans about 66 degrees of latitude and reaches elevations over 6000 m, is Cenozoic in age with the highest elevations uplifted only at the end of the Pliocene. The biota of the high Andes thus developed primarily during the Quaternary via immigration from Central America and radiations within the high elevation zones fostered by cyclical climatic changes. Glacial periods, correlated with those elsewhere, were times of ice expansion throughout the length of the Cordillera. In the most northern and southern parts of the Andes, glacial periods were times of range expansion and increased dispersal for supraforest elements: interglacials were periods of population restrictions. Across the Altiplano, the reverse situation applied. In addition to cold/warm cycles, arid/humid cycles variously affected the Andean biota. In contrast to the Andes, the Venezuelan and Brazilian highlands are ancient, in some cases over 1700 million years old. As a consequence of long term erosion, these highlands are lower than those in the western part of the continent and were less drastically affected by Quaternary climatic changes. Biogeographical evidence indicates that the primary Quaternary changes were lowered vegetation zones that allowed increased immigration from other montane regions. The floras and faunas of these highlands are consequently now composed of ancient elements mixed with Pleistocene immigrants.

FOOD RESOURCE PARTITIONING OF BURROWING SAND-PINE SCRUB REPTILES. Charles R. Smith. National Fish and Wildlife Laboratory, Gainesville, Florida.

Tantilla relicta, Eumeces egregius and Neoseps reynoldsi share essentially the same fossorial microhabitat within the sand-pine scrub of Florida. Except for Eumeces egregius (Mount, 1963), little has been reported in the literature on their food habits. Stomach analysis of specimens from several localities in Florida shows considerable differences in their preferred prey. Tantilla relicta is a completely fossorial snake which specializes on tenebrionid larvae. Neoseps reynoldsi also burrows exclusively and feeds on a variety of prey, including termites, lycosids, tenebrionid larvae and ant lions (Neurtoptera). Eumeces egregius, the most surficial of the three species, generalizes on blattids, lycosids and gryllids.

GROWTH AND MOVEMENT OF ALLIGATORS IN SOUTH TEXAS. E. Norbert Smith. Northeastern Oklahoma State University. Tahlequah, Oklahoma.

The growth and movement of the American alligator, Alligator mississippiensis, has been studied at the Welder Wildlife Refuge, Sinton, Texas for six years. Nearly 150 animals have been measured, weighed, sexed, marked and released. Eleven alligators have been recaptured and showed a mean annual weight gain of 8.9 ± 1.7 pounds (4.0 ± 0.8 kg) and 9.4 ± 0.8 inches (23.9 ± 2.0 cm). Rate of weight gain was positively correlated with initial body weight. Rate of length gain was not correlated with initial body length.

Alligators of all sizes were found to move freely between the Aransas River and impoundments on the refuge. Intense collecting activity on the lakes resulted in movement to the river.

Night counts and nest counts were found to be the most reliable method for estimating the population. Mark-recapture estimates are grossly inflated because alligators once caught become wary and are seldom recaptured. The population of alligators at the Welder Refuge appears to have doubled the past 5 years. This is probably the result of federal and state protection for the reptile.

This research was supported by generous grants from: The National Geographic Society, Welder Wildlife Foundation, and the Caesar Kleiberg Foundation.

Smith, E. Norbert - see Earnhart, V.

Sokol, O. M. - see Drewes

THE ALBANY PINE BUSH - A NORTHERN HERPETOLOGICAL OUTPOST FOR SOUTHERN SPECIES IN NEW YORK. Margaret M. Stewart and John Rossi. State University of New York at Albany.

The Albany Pine Bush, a pitch pine - scrub oak fire subclimax, has developed on sand dunes deposited as post-glacial Lake Albany drained out the Hudson River Valley. Several species of amphibians and reptiles, absent or rare from surrounding areas, live in the Pine Bush and comprise a community far more like that of Long Island than mid-state New York. Since the fire-controlled dune area is inhospitable to most species, about half as many species live there compared to surrounding areas. At present the Pine Bush supports 26 species while 43 are present in surrounding Albany County.

The "greater" sand plains area of Albany, Schenectady, Saratoga and Warren counties contain the northern-most populations in New York for 9 of the 26 species known from the sand plains. This pattern probably results from migrations of southern species up the Hudson Valley corridor, warmer than surrounding highlands. Distributional patterns of these amphibians and reptiles correspond to those of several plant species and appear to follow patterns of underlying bedrock.

As development encroaches on the Pine Bush, one of the few remaining open areas of the Capital District, populations of several species are being greatly reduced and may be entirely cut off from the main range of the species if not lost. One or more species have disappeared during the last century. Only rigid protection of the area can save these peripheral populations.

THE EFFECT OF CHLORINE ON THE DEVELOPMENT OF RANA PIPIENS EGGS. Betty I. Tarnowski. Butler University. (Presented by title only)

Developing eggs of Rana pipiens were exposed to various chlorine concentrations in a flow through system. A high mortality to developing embryos occurred after departure from the egg jelly at chlorine concentrations of 0.6 ppm and 0.9 ppm. Exposure of embryos to chlorine concentrations of 0.3 ppm and 0.04 ppm did not result in high mortalities following hatching, but increased the time necessary for completion of development. It is suggested that the egg jelly provided protection to the developing embryos since eggs exposed to chlorine concentratons of 0.6 ppm, only while in the egg jelly, showed no high mortality upon hatching or subsequent abnormal development. Survivors of the 0.6 ppm exposure through test duration resulted in chlorine-related abnormalities seen as a reduced body length and twisted tail. An analysis of chlorine-exposed egg jelly is in progress to determine if the egg jelly prevents contact of chlorine with the egg by chemically reacting with the chlorine.

GENUS, OR SUBGENUS: THAT IS THE QUESTION. Robert A. Thomas. Texas A&M University.

Current studies of certain Neotropical xenodontine colubrid snake genera indicate that confusion exists concerning parameters used to define species assemblages. The Philodryas-Alsophis generic complex is used as a model for discussion and comment is made on taxonomic categorical alternatives.

PARTITIONING OF FOOD IN A COMMUNITY OF TROPICAL FROGS. Catherine Ann Toft. University of California, Davis, California.

In the neotropical rain forest, a number of species of frogs are found in the leaf litter by day. These species partition food on the basis of food type and food size. The structure of this community has at least these components: number and equitability of species; the proportion of species that specialize on different types of prey; and the similarity in prey utilization of species that specialize on the type of prey.

The factors which determine the structure of this community will vary from place to place in the neotropics and include the predictability, abundance, and seasonality of food resources. Where the relative influences of these factors vary, communities of different structure result.

THE DYNAMICS OF WATER EXCHANGE BY EGGS OF PAINTED TURTLES (CHRYSEMYS PICTA). C. Richard Tracy, Gary C. Packard, and Mary J. Packard. Colorado State University, Fort Collins.

Water exchanges of painted turtle eggs depend upon such factors as substrate water potential, relative surface of the eggshell exposed to the nest atmosphere, hydraulic conductance of the eggshell, and conductance of the eggshell to water vapor. Eggs absorb liquid water across that portion of the eggshell in contact with the substrate, and simultaneously lose water vapor from that part of the eggshell exposed to air inside the nest chamber. Depending upon the rates of influx and efflux of water, eggs may experience increases or decreases in weight during incubation, or they may maintain a constant weight between oviposition and hatching. Water absorption by turtle eggs may have considerable adaptive significance, for hatchlings emerging from eggs absorbing and storing large quantities of water are heavier than hatchlings emerging from eggs taking up smaller quantities of water from the substrate. Additionally, water absorption equal to, or in excess of, water loss by transpiration assures that the shape of the egg will be such that sufficient space is available to accommodate the developing embryo.

Tracy, C. Richard - see Packard, M.

COLLECTION OF HIBERNATING CNEMIDOPHORUS SEXLINEATUS (LACERTILIA: TEIIDE) FROM VARIOUS PARTS OF ITS RANGE. Stanely E. Trauth. Auburn University.

A total of 776 six-lined racerunners was collected during hibernation periods extending from October, 1973, to April, 1977. Lizards were unearthed from 299 separate localities in nine states. Excavations generally were made on south- and west-facing, red clay banks along secondary highways. Animals were found to hibernate communally or singly. Communal hibernacula consisting of well-developed burrow systems were occassionally found. The "typical" microhabitat site for hibernation, which varied little throughout the portion of the range studied, is discussed.

HERPETOFAUNAL RELATIONSHIPS OF SOUTH AMERICA WITH AUSTRALIA. Michael J. Tyler. University of Adelaide.

With the sole exception of the Pygopodidae, the families comprising the modern Australian herpetofauna evolved beyond its continental borders. South America constituted the first source but, in contrast with South American/African herpetofaunal exchange, there was no direct land communication with Australia, and Antarctica constituted a substantial intermediary landmass.

From South America, Australia received the Leptodactylidae and Hylidae as totally separate entities, but conceivably simultaneously. The Leptodactylidae differentiated substantially: primarily to occupy terrestrial, fossorial and aquatic niches; secondarily to form a few scansorial animals. It is not represented by the Limnodynastinae, Myobatrachinae and Rheobatrachinae. The Hylidae exploited the arboreal and scansorial regimes, differentiating from a Neotropical hyline stock to constitute an endemic subfamily: the Nyctimystinae.

Within Australia the ancestral hylid stock may have resembled the Litoria aurea group, and at an early stage this diverged to give rise to a separate lineage lacking intercalary structures and now represented solely by the fossorial Cyclorana. The second lineage produced the scansorial, and ultimately more highly modified arboreal frogs. Within this second lineage intercalary structures have become more labile, and now include all other forms recorded in the Anura. For the systematist Cyclorana remains a problematical genus which cannot be accommodated in the Hylidae.

At the time of the onset of rapid drift of Australia from Antarctica (55-53 m.y. B.P.), Australia probably lacked snakes. (A possible exception is the large boid Wonambi known from the Pleistocene of South Australia, and with apparent affinites to Madstoia.) At that time the only lizards in Australia were the diplodactyline geckos from which the Pygopodidae evolved.

Pleurodine chelonians are restricted to the Neotropical and Australian Regions, but the Chelidae is the only modern family common to both. The current distribution of chelids in Australia is unquestionably relictual; the family occurred as far south as Tasmania in the Eocene, and in the now arid Central Australia in the Miocene. Chelid source ancestry is uncertain; the Lower Cretaceous Chelycarapookidae of Victoria is a candidate.

The depauperate nature of the Australian fauna was remedied in the Miocene. In the mid-Miocene New Guinea (the leading edge of the Australian continental plate) collided with a chain of oriental islands and accreted some of them. These islands were occupied by various ranid genera including Platymantis and by the microhylids Oreophryne and Sphenophryne. The Carettochelyidae, Scincidae, Boidae (Pythoninae), Elapidae, Agamidae, Varanidae and Typhlopidae all entered as a result of this collision - some at the time

of impact and others subsequently. The Ranidae and Scincidae had at least two invasions, and in general the sequence of arrival greatly influenced the relative success of the colonisers. Nevertheless ranids and microhylids have scarcely penetrated northern Australia. Hence the anuran fauna of Australia is almost wholly from a South American source, whereas the reptile fauna is predominantly Oriental.

VanDenbos, Gary - see Phillips.

VanDenbos, Gary - see Williams.

STRUCTURAL PATTERNS OF SPONTANEOUS AND EVOKED CALLS IN THE BUFO SPINULOSUS SPECIES GROUP (AMPHIBIA-BUFONIDAE). Alberto Veloso M. and Mario Penna V. Universidad de Chile.

There are two allopatric species of the genus Bufo in Central Chile (Lat. 33S). Bufo spinulosus lives in the highlands (Andes mountains) and B. chilensis in Acacia caven steppes and coastal lowlands. A third species, B. atacamensis (Lat. 28S) has a narrow distributional range and is restricted to small valleys surrounded by an extreme xeric environment. Absence of spontaneous vocal activity has been indicated as an important character in this group. This statement is not according with present observations. Bufo spinulosus during the reproductive season shows a spontaneous call in the field. The call consist in a complex signal initiated with a single pulse structure followed by a trill. The same signal is present during homosexual and heterosexual amplexus or can be artifically evoked. Bufo chilensis, a closely related species, shows a typical release call, elicited by homosexual amplexus. A second call is produced during the amplexus and differs from the release call in duration, pulse frequency and energetic parameters. There is geographic variation in the release call of B. chilensis. The northern populations exhibit different pulse frequency and modulation than southern populations. Furthermore, marginal northern populations show similar call characteristic than the geographically isolated Bufo atacamensis. Intrageneric relationships are pointed out by present call analysis. Supported by Proj. 3098. Univ. de Chile and Prog. Multinacional de Genetica, O.A.S.

THE HISTORY AND DISTRIBUTION OF AN INTRODUCED POPULATION OF LACERTA MURALIS (REPTILIA, SAURIA, LACERTIDAE), IN CINCINNATI, OHIO. Gregory O. Vigle. Cincinnati Museum of Natural History.

A sizable population of Lacerta muralis has been established in an urban area within the city limits of Cincinnati as the result of the release of two individuals in 1948. The original pair of lizards was captured in the Lake Como region of northern Italy by a young boy who brought them to Cincinnati and released them outside his home, hoping that they would reproduce. They did.

The lizards are present in large numbers on stone and concrete walls on the north valley wall and flood plain of the Ohio River. It appears that the lizards inhabit an area of approximately one by three kilometers, with the original release site being near the center of distribution. Well-traveled roads have not limited the spread of the population.

AMPHIBIAN EGGS: A NEGLECTED MICROHABITAT. Jaime Villa. Section of Neurobiology and Behavior, Cornell University.

In the past hundred years herpetologists have collected the eggs of hundreds of amphibian species and have described them (or the resulting larvae), usually viewing the eggs as a brief, transitory stage of the amphibian life cycle.

Organisms found in association with the eggs, however, have been traditionally neglected (or given only very limited attention) although they may be a very important (often adverse) factor in the amphibian's population. For many organisms--ranging from fungi and single-celled algae--amphibian egg masses are an important (and sometimes even obligatory microhabitat where developing and/or feeding takes place. Cases are presented of associations ranging from occasional commensals to parasites and predators of the embryos before or after hatching. Usually these associations are not restricted by taxonomic or geographic boundaries. On the contrary, they are likely to be found anywhere in the world where amphibians breed; work in this direction is only beginning.

GENETIC DIFFERENTIATION, ALBUMIN EVOLUTION, AND THEIR BIOGEOGRAPHIC IMPLICATIONS IN PLETHODONTID SALAMANDERS (GENUS HYDROMANTES) OF CALIFORNIA AND SOUTHERN EUROPE. David B. Wake, Linda R. Maxson, and Gloria Z. Wurst. University of California, Berkeley; University of Illinois, Urbana; University of California, Berkeley.

Genetic variation and albumin evolution were studied in the plethodontid salamander genus Hydromantes using starch-gel electrophoresis and the immunological technique microcomplement fixation. There is generally high concordance in the data from these two approaches. The three California species are relatively little differentiated, with H. shastae showing as much differentiation among various populations as occurs between the three species. The Sardinian H. genei and H. italicus (from the mainland, primarily Italy) are strongly differentiated, and form a separate but not well defined group, while the three California species form a much tighter, less differentiated group. The curious distribution of the highly derived genus and the fact that the two European species are the only members of the large family Plethodontidae in the Old World are considered in the light of the new data. Plethodontids are thought to have dispersed to present-day Europe from North America, with phylogenetic separation of the groups dating to Oligocene times. Separation of the two European species was just a little more recent. Hydromantes, like many other amphibians, has changed little at the organismal level despite great change at the level of structural genes (research supported by NSF grant BMS 74-20922).

THE EFFECTS OF TEMPERATURE ON THE REPRODUCTIVE CYCLE OF THE MALE WATER SNAKE, (NATRIX SIPEDON). Michael R. Weil and Robert D. Aldridge - St. Louis University.

The effect of various temperatures upon the male reproductive cycle of the common water snake (Natrix sipedon) was studied. Snakes were divided into five groups and kept in five different temperature regimes for ten weeks. Those kept in chambers 1-4 were maintained at 21.3, 23.3, 27.4, and 29.3°C for 8 hours per day respectively. All were kept at 20°C for the remaining 16 hours per day. Controls were kept at 20° C for the entire day.

Testicular growth appears to be positively correlated with increasing temperatures, as measured by estimated testis volumes. Additionally, increases in seminiferous tubule diameters appear to be nearly linearly related to increases in temperature. This was determined by measuring 20 seminiferous tubule diameters for each individual and averaging the results for all individuals within an environment. Interstitial cell nuclear diameters were measured in the same manner as seminiferous tubule diameters and were found to be unrelated to temperature. Spermatogenesis was measured

by approximating the number of rows of each type of meiotic cell and then assigning one type as being most prevalent. Rate of germ cell proliferation appeared to increase with increasing temperatures except in the two warmest environments where spermatogenic activity was similar.

HERPETOFAUNAL SURVEY OF THE SINAI PENINSULA (1967-1977). Yehuda L. Werner. University of Chicago, Illinois

Collections from Sinai in the Hebrew University of Jerusalem and in Tel-Aviv University, made in 1956 and since 1967, exceed 1000 specimens and 50 taxa. The author created manual locality-record maps as part of a distributional checklist of the reptiles of Israel and Sinai being prepared with J. H. Hoofien; and is examining morphological variation as part of a computerized study of geographical variation of squamates in the area Turkey-Sinai with C. Kosswig (DFG-funded).

The only amphibian found is Bufo viridis.

Of the 50-plus reptiles, 9 taxa have not previously been confirmed from Sinai; only 5 taxa do not occur in the Negev as well. Ten additional taxa occur in both Israel and Egypt: 5 probably do occur in Sinai; 5 others apparently lack suitable habitats there (including Acanthodactylus pardalis whose record had been based on an A. boskianus - courtesy H. Marx). A dozen literature records await verification and some (e.g., Agama mutabilis seem erroneous.

The interesting reptile community of N Sinai dunes includes Testudo kleinmanni (in dunes elsewhere in the region replaced by T. graeca), Stenodactylus petrii (elsewhere S. doriae), S. stenodactylus, Agama savignii (elsewhere A. pallida), Chamaeleo c. musae (C. c. recticrista), Acanthodactylus scutellatus (elsewhere A. boskianus or A. schreiberi), Eremias olivieri, Sphenopssepsoides (elsewhere Chalcides ocellatus), Scincus scincus, Lytorhynchus diadema, Spalerosophis vipera (elsewhere C. cerastes).

Ptyodactylus hasselquistii guttatus inhabits northern and central Sinai and southern mountaintops, whereas in the southern canyons P. h. cf. hasselquistii occurs.

Thus, herpetologically, Sinai turned from a poorly-known into a well-known corner of the Near-East.

PLATYSTERNON AND THE EVOLUTION OF CHELYDRID TURTLES. K. N. Whetstone. University of Kansas, Lawrence.

Gaffney (1975) placed the Asiatic genus Platysternon in the Chelydridae on the basis of a presumed sister group relationship to Macroclemys. Additional specimens of the Miocene Macroclemys schmidti indicate that some of the characters hypothesized by Gaffney to be synapomorphies actually represent convergences. Also, Platysternon lacks the cruciform plastron, narrow epiplastra, "T" shaped entoplastron, serrated carapacial margin, and long costiform process on the nuchal bone which are found in Chelydra and Macroclemys. If Platysternon is a chelydrid, loss of these characters must be interpreted as evolutionary reversals. No hypothesis of reversal for these characters is necessary if Platysternon represents the sister group of the Emydinae (sensu McDowell). Platysternon shares at least one presumed synapomorphy with emydines and testudinids, the presence of two biconvex vertebrae in the neck. Platysternon also has a double articulation between the 5th and 6th cervicals, a character otherwise unique to the Emydinae.

The oldest known chelydrid turtle is a new genus from the Upper Cretaceous Hell Creek Formation of Montana. This turtle is distinguished from other known chelydrids by a suite of plesiomorphic characters which support Gaffney's theory of independent shell reduction for chelydrids and toxochelyids.

Whitford, Walter G. - see Creusure.

ANURAN SUCCESSION AT TEMPORARY PONDS IN A POST OAK SAVANNA REGION. John A. Wiest, Jr. Texas A&M University.

Reproductive strategies of anurans utilizing temporary ponds in a Texas post oak savanna region were studied during an abnormally wet year, September 1972 through September 1973. Anuran succession was documented and correlated with varying environmental conditions. The overriding causes of variation in anuran reproductive patterns were due to fluctuations in air and water temperatures, rainfall, and possibly humidity. The anuran species in the study area were separated spatially and temporally. Calling, breeding, and larval periods for nine species were documented. The vocalization strategy, based on the first evening when calling was heard for each species, was as follows: Rana sphenocephala, vocalized first, followed by Pseudacris streckeri, Pseudacris triseriata, Pseudacris clarki, Scaphiopus holbrooki, Acris crepitans, Hyla versicolor, Bufo valliceps, and Gastrophryne olivacea. Males of each species initiated the calling period, and the presence of adult females determined the breeding period. Calling activity was not always a good predictor of the presence of larvae for a particular species, and each species was present as larvae over a different time span. For most anurans there was a larval bloom in April and May, and these months corresponded to the time of the year associated with the most rainfall. Because of the drying tendencies of temporary ponds, there is an adaptive advantage for most larvae to be in the ponds in spring months.

EFFECT OF THYROID HORMONE ON HEPATIC CELL PROLIFERATION AND TURNOVER IN THE BULLFROG TADPOLE. James Williams, Wahleah Baker, Robert Phillips and Gary VanDenbos. Northeastern Oklahoma State University, Tahlequah, Oklahoma.

The precocious initiation of a number of biochemical changes associated with metamorphosis have been documented using thyroid hormones(TH). Reports describing the biochemical transformation and ultrastructural reorganization of the liver in Rana catesbeiana tadpoles during metamorphosis fall into two conflicting categories. One group assumes the metamorphic transition occurs in a population of cells existing before the onset of metamorphosis. Another assumes the hepatic transition occurs in a new population of cells, cells produced in response to early metamorphic signals. The audioradiographic analysis of the incorporation of ^{3}H thymidine into liver cells as a function of TH was used as an indicator of mitotic activity. These studies suggest a TH mediated increase in the fixation of ^{3}H thymidine in particular hepatic cells while the labeling kinetics of ^{125}Id-Urd suggest the thyroid hormone induced metamorphic transitions of the liver can be thought of as occurring in an essentially fixed population of cells. (Supported by NIH Grant 1-S06-RR-08123)

Williams, James - see Phillips

Wooley, Tyler A.- see Pettus.

BIOGEOGRAPHY OF THE HERPETOFAUNA OF THE DESERTS OF WESTERN SOUTH AMERICA. John W. Wright. Los Angeles County Museum of Natural History, Los Angeles, California.

NO ABSTRACT RECEIVED.

Wurst, Gloria - see Wake.

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Now in its tenth year, Herpetological Review remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the Journal of Herpetology -- see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Authors are urged to write the editors before submitting feature-length articles. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles are desired. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

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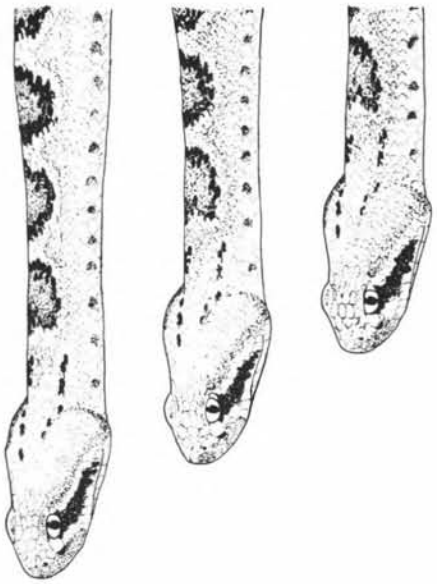
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Contents

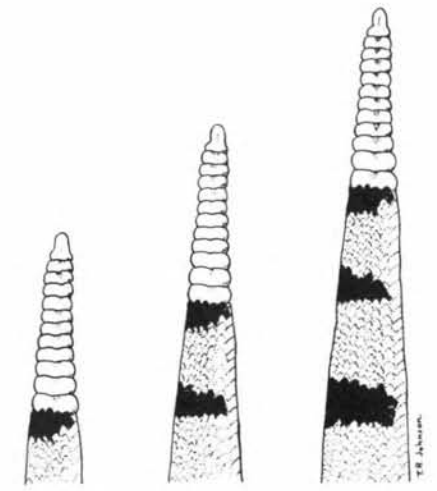
ANNUAL MEETING NEWS
Featured institution: Herpetology at the University of Kansas, by W. E. Duellman 30
FEATURE ARTICLES
Reproduction of the Chinese red snake, Dinodon rufozonatum (Cantor) in captivity, by J. E. Simmons. . 32
Deposition of paratypes of Eurycea junaluska, by D. M. Sever 32
A Massachusetts hibernation site of the red-backed salamander, Plethodon cinereus, by J. G. Hoff. . . 33
Winter collection of Cnemidophorus sexlineatus eggs from Arkansas, by S. E. Trauth 33
Record egg clutches for Clemmys insculpta, by J. H. Harding 34
HERPETOLOGICAL HUSBANDRY
Reproduction in captive Lower California rattlesnakes, Crotalus enyo enyo (Cope), by B. W. Tryon and C. W. Radcliffe 34
CONSERVATION
Madras Crocodile Bank Trust 36
Response to Lazell's letter on alligators, by W. C. Blakeney, Jr. 36
Response to Bowler's letter on alligators, by C. A. Ross 37
Bowler responds to Ross 37
Legislation and rulemaking re herps 37
GEOGRAPHIC DISTRIBUTION
New records 38
The herpetofauna of Ossabaw Island, Chatham County, Georgia, by S. B. Ringler 39
Distributional records of amphibians and reptiles from Puerto Rico, by R. Thomas and K. R. Thomas. . 40
New distributional records for amphibians and reptiles from the provinces of Catamarca, La Rioja and Cordoba, Argentina, by A. C. Hulse 40
Distributional notes on Kirtland's watersnake, Clonophis kirtlandi (Kennicott), by J. K. Tucker, R. S. Funk and J. T. Collins 40
NEWS NOTES 41
ERRATA 42
REGIONAL SOCIETY NEWS
St. Louis Herpetological Society 42
Chicago Herpetological Society 43
SSAR TREASURER'S REPORT FOR 1976 43
CURRENT LITERATURE 44
SSAR ANNUAL MEETING PROGRAM TITLES 67
ADVERTISEMENTS 69

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Annual Meeting News

HERPETOLOGY AT THE UNIVERSITY OF KANSAS

One of the first actions of the Kansas Territorial Legislature was the creation of an institution of higher learning called the University of Kansas Territory. In September 1866 the first class of 29 men and 26 women entered The University of Kansas located on the hill "Mount Oread" on the outskirts of the village of Lawrence. From that small start The University of Kansas has grown to a comprehensive institution of higher learning. The main campus, where more than 22,000 students now attend classes, is situated in the midst of Lawrence, a thriving community of more than 50,000 residents in the forested hills of eastern Kansas midway between Kansas City and Topeka.

Biological Sciences have had a long and illustrious history at The University of Kansas. Indeed in 1864 the Kansas Territorial Legislature authorized the establishment of a "Cabinet of Natural History." One of the first professors at the university, Francis Huntington Snow, was a renowned entomologist who became Chancellor of the university (1890-1901) and established the nucleus of insect collections upon which the Snow Entomological Museum was founded; the museum currently houses more than 2.5 million specimens. During Snow's chancellorship, several famous biologists joined the faculty; among them were Lewis Lindsay Dyche, Clarence E. McClung, and Samuel W. Williston. McClung initiated the comparative study of animal chromosomes. Dyche and Williston were responsible for building the collections of recent and fossil vertebrates, respectively, and in 1900 the state legislature appropriated funds for the construction of the Museum of Natural History, which honors Dyche's memory by bearing his name--Dyche Hall. A large wing was added to the museum in 1963.

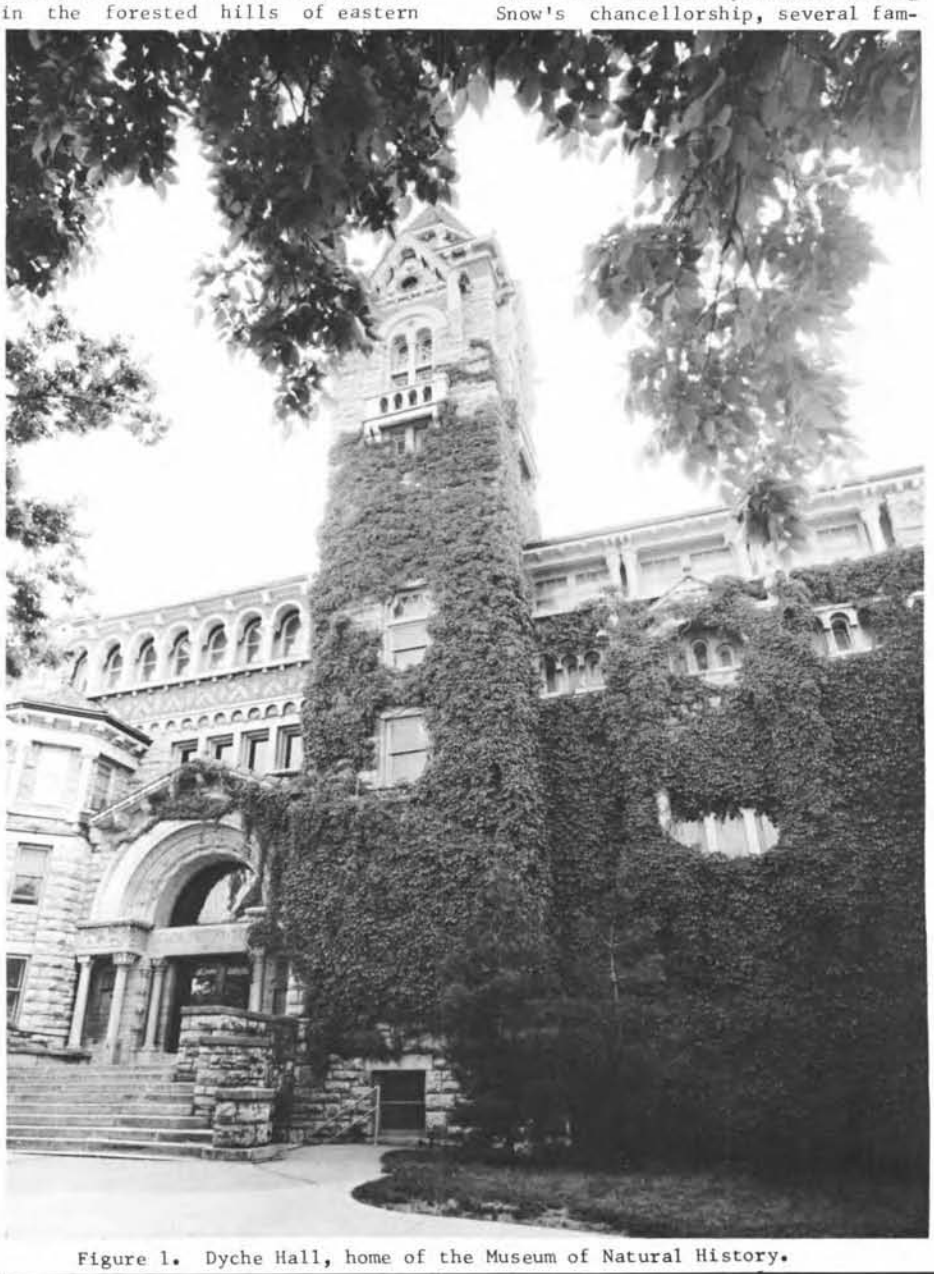


Figure 1. Dyche Hall, home of the Museum of Natural History.

The early (1900-1920) herpetological collections of the Museum of Natural History were obtained by field parties working under the auspices of the State Biological Survey. However, commencing in the 1920's, Dr. Edward H. Taylor and his students expanded collecting efforts to adjacent states, southeastern United States and eventually to Mexico. Thus, as the first curator of the herpetological collections, Taylor influenced their growth and scope, and there were more than 40,000 specimens at the time of his retirement as curator in 1954. Taylor had an active group of graduate students, notable among whom were David M. Dunkle, Claude W. Hibbard, Hobart M. Smith, Wilmer W. Tanner, and Joseph A. Tihen. In the 1950's John M. Legler and Robert G. Webb completed their Ph.D. work under the guidance of Henry S. Fitch. John M. Legler was an interim curator of herpetology from 1954 to 1959, during which time the collections increased to 51,000 specimens, the increment representing the collections primarily from Costa Rica made by Edward H. Taylor.

William E. Duellman became Curator of Herpetology in 1959 and initiated active collecting and research programs in Mexico, Central America and South America. With the enthusiastic assistance of numerous graduate students and Linda Trueb, Adjunct Curator of Herpetology, the Division of Herpetology became one of the most active and productive divisions in the Museum of Natural History. The collections grew to more than 175,000 specimens (the last 15,000 having been computer-catalogued); including more than 300 primary types and 7,500 skeletons. Associated with the collections are more than 6,000 color transparencies of amphibians and reptiles, 1350 tape recordings of anuran calls, and smaller holdings of chromosome preparations and serial sections of heads of anurans. The herpetological library contains nearly 1000 bound

volumes and more than 6000 reprints. Facilities in the Museum of Natural History include histological, karyological, and bioacoustical laboratories, plus dark room and computer facilities.

Other centers of herpetological activity at The University of Kansas include the experimental laboratories in Haworth Hall, the State Biological Survey, and the Natural History Reservation. The laboratories in Haworth Hall are under the direction of Harvey B. Lillywhite. Facilities there include controlled environmental chambers and rooms, physiological instrumentation, gas analyzer, temperature recorders, and instruments for measuring micrometeorological variables.

The State Biological Survey of Kansas is required by Kansas Statute to determine the distribution, abundance, and population characteristics of native plants and animals of the state and to publish reports of the findings. Jan Caldwell, Assistant Director of the State Biological Survey, directs investigations on vertebrates and collaborates with Joseph T. Collins in documenting the distribution of amphibians and reptiles in Kansas.

The University of Kansas acquired the Natural History Reservation in 1947. This 590 acre tract is 7 miles north-northeast of the campus. The reservation includes flat uplands, rocky slopes, and bottom land; the tract is used by classes in ecology and natural history and for a variety of research projects. Many publications have dealt with diverse aspects of the soils, meteorology, and biota of the area. Long term studies on the herpetofauna (27 reptiles and 10 amphibians) have dealt with food habits, spatial relationships, temperature relationships and reproductive cycles. Many of the common species have been subjects of autecological studies. Henry S. Fitch has been the resident naturalist and superintendent of the reservation since 1948.

Present faculty members, departmental affiliations, and herpetological research interests are:

Jan Caldwell, State Biological Survey and Department of Systematics and Ecology--1) Anti-predator mechanisms in tadpoles; 2) Demography and population structure of amphibians; and 3) Hybridization and call discrimination in the Rana pipiens complex in Kansas.

William E. Duellman, Museum of Natural History and Department of Systematics and Ecology--1) Systematics of Neotropical hylid and centrolenid frogs; 2) Evolution of egg-brooding hylid frogs; 3) Biogeography of the Andean herpetofauna; 4) The amphibians and reptiles of Panama; and 5) Community diversity in tropical herpetofaunas.

Henry S. Fitch, Department of Systematics and Ecology--1) Comparison of reproductive strategies of tropical and temperate reptiles; 2) Ecology and evolution of Anolis in Mexico and Central America; 3) Ecology and conservation of Iguana and Ctenosaura in Central America; and 4) Natural history of the glass lizard, Ophisaurus attenuatus.

Harvey B. Lillywhite, Departments of Physiology and Cell Biology and Systematics and Ecology--1) Blood pressure regulation in snakes; 2) Physiological ecology of amphibians with reference to heat and water exchanges; 3) Functional correlates of integumental structure in reptiles; and 4) Small animal responses to fire and habitat disturbance in Southern California chaparral.

Edward H. Taylor, Museum of Natural History and Department of Systematics and Ecology (emeritus)--Systematics and morphology of caecilians.

Linda Trueb, Department of Systematics and Ecology and Association of Systematics Collections--1) Evolutionary osteology of anurans; 2) Systematics of leptodactylid frogs, genus Telmatobius; 3) Osteology of hylid frogs, genus Gastrotheca; and 4) Evolutionary relationships of Neotropical montane bufonids.

Other personnel engaged in herpetological research include Joseph T. Collins, Museum of Natural History--Studies on the herpetofaunas of Kansas and Kentucky; Stephen R. Edwards, Association of Systematics Collections--Systematics of dendrobatid frogs, genus Colostethus; and George R. Pisani, Division of Biological Sciences--Systematics of the snakes of the genus Virginia and aspects of snake reproduction.

Four non-resident Research Associates in the Division of Herpetology of the Museum of Natural History contribute to the research programs at the university; these are Werner C.A. Bokermann, Sao Paulo, Brasil; John D. Lynch, Lincoln, Nebraska; Michael J. Tyler, Adelaide, Australia; and Alberto Veloso M., Santiago, Chile.

A very active graduate program in herpetology at The University of Kansas has resulted in 15 students completing the Ph.D. in the past decade--Ray D. Burkett, Jan Caldwell, Donald R. Clark, Jr., Martha L. Crump, Arthur C. Echternacht, Stephen R. Edwards, Russell J. Hall, Thomas H. Fritts, John D. Lynch, Richard R. Montanucci, Charles W. Myers, Michael V. Plummer, Gerald T. Regan, A. Kenneth Smith, and Linda Trueb.

A diversity of research in herpetology is reflected among the dissertation topics of the 18 students currently pursuing graduate degrees at The University of Kansas: Marshall L. Anderson (Ph.D.) --Morphology of anuran hands and feet; Thomas J. Berger (Ph.D.)--Analysis of tropical tadpole communities; David C. Cannatella (Ms.)--Evolutionary biology of phyllomedusine frogs; Eleanor J. Daly (Ph.D.)--Dissorophids and the evolution of the lissamphibia; Geoffrey Friedman (Ms.)--Biochemical adaptations in temporary muscle anoxia in anurans; Richard L. Lattis (Ph.D.)--Responses to micro-climates by small snakes; Julian C. Lee (Ph.D). -- Eco-biogeography of the herpetofauna of the Yucatan Penin-

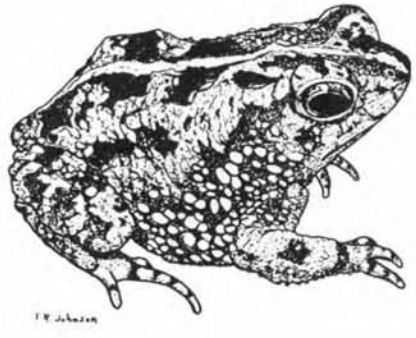


Figure 2. Kansas Union, site of sessions of the 1977 annual meetings.

sula; Juan R. Leon (Ph.D.) --Reproductive strategies of anurans in a seasonally wet tropical community; Luis Malaret (Ph.D.) -- Geographic variation in reproduction of collared lizards; Jaime E. Pefaur (Ph.D.) --Species diversity in the Lomas of southern Peru; Gregory K. Pregill (Ph.D.) -- Pleistocene herpetofaunas of the Greater Antilles; Rebecca A. Pyles (Ms.)--Anuran osteology: interspecific variations; Johnna M. Roberts (Ph.D.)--Structure and function of reptilian epidermis in relation to cutaneous water loss; Alan H. Savitzky (Ph.D.) -- Intergeneric relationships of xenodontine snakes; Terry D. Schwaner (Ph.D.) --Evolutionary ecology and biogeography of Samoan lizards; Robert C. Waltner (Ph.D.)--Effect of altitude on ecology of Himalayan Agama; Kenneth N. Whetstone (Ms.)--Early evolutionary history of chelydrid turtles; Bernard Willard (Ms.)--Phenetic analysis of Leptodeira.

Personnel at The University of Kansas are active in biological organizations. Jan Caldwell is the Past-President of the Kansas Herpetological Society. Joseph T. Collins is President-Elect of the Society for the Study of Amphibians and Reptiles and with George R. Pisani edits Herpetological Review. Pisani is also editor of Herpetological Circulars. William E. Duellman is the President of the Herpetologists' League and a Council Member of the Society of Systematic Zoology. Stephen R. Edwards is Secretary of the Society for the Study of Amphibians and Reptiles and, with Linda Trueb, manages the Secretariat of the Association of Systematics Collections, a consortium of 65 institutions housing systematics collections and 10 affiliate profesional societies, including the American Society of Ichthyologists and Herpetologists, the Herpetologists' League, and the Society for the Study of Amphibians and Reptiles.

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REPRODUCTION OF THE CHINESE RED SNAKE, DINODON RUFOZONATUM (CANTOR) IN CAPTIVITY

Two clutches of eggs from Dinodon rufozonatum have been hatched at the Fort Worth Zoological Park since 1973. One report in the literature gives a clutch size of 11 eggs for this species, and mentions that a second female contained eight developed and three undeveloped eggs (Pope, 1929). Two specimens at the American Museum of Natural History were reported to be embryos "on the point of hatching." The two embryos, 232 and 244 mm in length, came from eggs of 33 and 38 mm in length respectively (Pope, 1935).

Since 1973, one adult male and two adult female Dinodon rufozonatum have been housed on exhibit in a two foot fiberglas enclosure (Hulsey, 1973). They are provided with a gravel substrate, water bowl, and the cage is decorated with plastic plants, rocks, and a piece of bark. Temperature in the enclosure varies from approximately 23 to 32 C. Adults feed on two to three adult mice per week.

The snakes were received at the zoo on 3 May 1973. The first clutch was laid on 13 July 1973 and consisted of three eggs. The eggs ranged from 23 to 33 mm ($\bar{x}$ = 31 mm) in length, and had a diameter of 15 to 16 mm ($\bar{x}$ = 15.3 mm). Their weights ranged from 4.2 to 5.0 g ($\bar{x}$ = 4.7 g). Two young hatched after an incubation period of 49 da August 1973. Each young measured 240 mm in length, and weighed 4.3 and 3.7 g ($\bar{x}$ = 4.0 g).

Breeding activity was observed on 22 June 1974 and again on 21 November 1974, but no eggs were laid that year. Breeding activity was next recorded on 26 February 1976. The gravid female was removed from exhibit and provided with a bowl containing a damp mixture of sphagum moss and vermiculite for egg deposition. On 20 April 1976, seven white, leathery eggs were laid. The eggs were placed in a 5 gallon aquarium with an equal mixture of vermiculite and water (Tryon, 1975). The eggs ranged from 32 to 47 mm ($\bar{x}$ = 38.7 mm) in length and from 15 to 17 mm ($\bar{x}$ = 15.3 mm) in diameter. Weight ranged from 5.2 to 8.3 g ($\bar{x}$ = 6.9 g). Temperature during incubation fluctuated between 29 and 35 C. The total length of the hatchlings was from 243 to 265 mm ($\bar{x}$ = 254.8 mm). Hatchlings were measured using the squeeze box technique (Quinn and Jones, 1974). Their weight ranged from 4.6 to 7.4 g ($\bar{x}$ = 6.2 g).

Hatchlings from both the 1973 and the 1976 clutches had the same pattern as the adults, but the colors were much more vivid. All were fed on newborn mice with the exception of one individual from the 1976 clutch which fed on Virginia.

A gravid female was removed from exhibit on 3 March 1977 and provided with a nesting box containing damp sphagnum moss. On 22 March 1977, 12 white, non-adjering eggs were deposited in the medium provided. The eggs range from 29 to 39 mm ($\bar{x}$ = 33.4 mm) in length, 16 to 18 mm ($\bar{x}$ = 16.8 mm) in diameter, and 5.3 to 7.1 g ($\bar{x}$ = 6.2 g) in weight. The eggs are being incubated as described above.

The data reported here was collected and recorded by the staff of the Herpetarium at the Fort Worth Zoological Park.

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DEPOSITION OF PARATYPES OF EURYCEA JUNALUSKA

Paratypes of Eurycea junaluska listed by Sever, Dundee, and Sullivan (1976) as being in the D.M. Sever collection (DMS) have been deposited in the Museum of Vertebrate Zoology, University of California (MVZ) and in the Museum of Zoology, the University of Michigan (UMMZ). Collection numbers for these specimens are:

DMS 1865.....MVZ 128276
DMS 1866.....MVZ 128277
DMS 2077.....UMMZ 142790
DMS 2144.....UMMZ 142791
DMS 2128-2138.....UMMZ 142792-142802

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A MASSACHUSETTS HIBERNATION SITE OF THE RED-BACKED SALAMANDER, PLETHODON CINEREUS

During February 1976, 87 hibernating Plethodon cinereus (Green) were found incidental to the excavation of tree stumps in Plymouth County, Massachusetts.

Four to twelve stumps of each of the following recently cut trees were removed from a one-quarter acre site: White oaks, Quercus alba; Red maple, Acer rubrum; Sassafras, Sassafras albidum; Sour-gum, Nyssa sylvatica; and White pine, Pinus strobus.

An excellent opportunity for detailed observation was possible since excavation was done with a hand operated portable winch and a shovel. Bishop (1941) in his natural history review of this species mentions no hibernation sites. Grizzell (1949) reports a single specimen from an excavated woodchuck den. Cooper (1956) records an aquatic hibernation and Caldwell and Jones (1973) and Caldwell (1975) report two winter congregations in ant mounds.

Eighty-six of the salamanders were collected from beneath the stumps of six recently cut white oaks. They occurred by count as: 3, 4, 11, 12, 21 and 35. All were taken from the B horizon (subsoil) at depths from 30-36 inches. The animals were usually found individually in partially rotted-out root channels. The favorite sites were still lined with root cork with some moist decomposing root tissue still present. The soil temperature during excavation was from 5-9 C. All of the salamanders were active immediately after discovery. A stomach analysis of nine individuals showed six to be empty; the other three contained fragments of Carpenter ants, Camponotus sp.

The lone individual not collected from white oak root systems was collected beneath the large tap root of a sour-gum. Two American toads, Bufo americanus, were also collected beneath a sour-gum. No other reptiles or amphibians were noted.

It seems apparent that the decaying root system of dead white oaks is a preferred hibernation habitat for the red backed salamander in woodlots of southeastern Massachusetts.

Jeffrey G. Hoff and James G. Hoff, Jr. assisted with the excavation work.

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WINTER COLLECTION OF CNEMIDOPHORUS SEXLINEATUS EGGS FROM ARKANSAS

The overwintering of incubating eggs or fully-developed young in the egg, termed embryonic hibernation (Porter, 1972), has been reported for few reptiles; e.g., Sphenodon punctatus (Sharell, 1966), Chelydra serpentina serpentina (Oliver, 1955; Porter, 1972), Clemmys insculpta and Chrysemys picta (Nichols, 1933; Oliver, 1955). Bellairs (1970) indicated that gestating embryos, following an autumn mating by parents, may overwinter within their hibernating mother; however, no supportive evidence was given. Embryonic hibernation is usually a direct result of cold early autumn temperatures which retard the hatching or embryological development of young (Oliver, 1955). Jameson (1974) suggested that montane populations of Sceloporus graciosus lay eggs which overwinter and hatch the following spring. The following is the first documented evidence known to this author of overwintering of eggs for any North American lizard.

While searching for hibernating C. sexlineatus on December 28, 1974, on top of Judea Mountain (609 m), 6.5 km S Jasper, Newton Co., Arkansas, I unearthed two racerunner eggs. The nest was found on a well-drained, red clay embankment of a moderate, southwest-facing slope. The eggs were at a depth of approximately 1 dm in an oval chamber adjacent to the hibernation burrow of an adult female racerunner. Unfortunately, one egg was destroyed during excavation. The other, measuring 18 mm x 11 mm contained a healthy-looking, and, based on my past experience, viable embryo (27 mm SVL; 50 mm tail length) and a small amount of yolk. The distinctive color pattern was evident, indicating that embryonic development was essentially complete (Brimley, 1903).

C. sexlineatus (adults, juveniles, and hatchlings) hibernate in burrows that are situated in close proximity to nesting cavities (Trauth, 1974). I have uncovered late season clutches along with hibernating animals from Washington and Independence Counties (Ozark Mountains) from late August to mid-September in 1973 and 1975, and several clutches were taken during September, 1974, from Dallas Co. (Coastal Plain). However, excavation of dens and collection of over 500 hibernating racerunners from all regions of the state resulted in only these two eggs being taken during winter conditions (mean January temperature for Newton Co. - 2.7 C). Survival of C. sexlineatus embryos at temperatures near freezing appears to be similar to results experimentally obtained for Eumeces fasciatus and E. obsoletus eggs (Fitch, 1964; Fitch and Fitch, 1967). If we assume that overwintering eggs are viable, the spring hatchlings (late April-early May) in Arkansas would probably fail to become sexually mature their first summer and would not contribute to the reproductive effort like most first-year animals of this species.

I wish to thank Drs. J.L. Dobie, G.W. Folkerts, and R.H. Mount for their comments on this manuscript.

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RECORD EGG CLUTCHES FOR CLEMMYS INSCULPTA

Ernst and Barbour (1972) record the maximum clutch size for the Wood Turtle (Clemmys insculpta) as 12. Gammons' (1871) account of a female laying 18 eggs was rejected by Carr (1952). On 13 June 1976, I collected a clutch of 18 eggs of this species during an on-going study of a marked population of Wood Turtles in Schoolcraft County, Michigan. The eggs were tightly packed in a globular cluster; the top egg was approximately 70 mm below the surface. The structure of the nest left little doubt that it was the work of a single female turtle. All but two of the eggs were of normal size for the species; none of the eggs were fertile. The normal-sized eggs ranged in length from 33 to 36 mm (mean = 34 mm). The two abnormal eggs were both 30 mm in length, and irregular in shape.

Previously, two clutches of 13 eggs each were collected in the study area on 19 June 1974 and 24 June 1975. On the former date, the nesting process was observed; the nesting turtle proved larger than average for a female of this population (carapace length = 194 mm). All eggs from these two clutches proved fertile and hatched successfully in the laboratory. The possible existence of a direct relationship between size of the female and brood or clutch size receives frequent mention in the literature, but the relationship between egg fertility and clutch size appears to be unknown at present.

I would like to thank Dr. J. Alan Holman for offering valuable suggestions during preparation of this manuscript.

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Herpetological Husbandry

REPRODUCTION IN CAPTIVE LOWER CALIFORNIA RATTLESNAKES, CROTALUS ENYO ENYO (COPE)

There is little literature data concerning reproduction of the Lower California rattlesnake, Crotalus enyo enyo, a form occurring from El Marmol south to Cape San Lucas, Baja California, Mexico. Klauber (1937, 1972) estimated the average size at birth as 225 mm, and gave brood sizes of six and nine. The present report gives details of successful reproduction in captive C. e. enyo in two separate collections with notes on the young from four litters.

MATERIALS AND METHODS.-- A young adult female C. e. enyo (total length 714 mm, weight 447 g, postpartum) received 6 December 1972 and a young adult male (total length 662 mm, weight 332 g) received 20 October 1974, were placed on exhibit at the Fort Worth Zoological Park in a 61 cm fiberglas cage (Hulsey, 1973). The cage was decorated with several rocks and a small live cactus, arranged to provide hiding areas. Pea gravel comprised the substrate. Water was always available but the cage remained dry. Artificial lighting was provided between 0800 h and 1730 h daily with a 30 w fluorescent tube (Vitalite). Additionally, clear skylights above the cage provided a natural photoperiod for the Fort Worth area. Temperature fluctuated daily from approximately 23° C to 32° C in summer and from approximately 22° C to 28° C in the winter. Each snake fed at weekly intervals on one 15-20 g mouse.

The conditions under which the specimens in the collection of the second author were kept were somewhat different from those given above. The two females (CWR specimens A, B) were born in captivity during the first week in August 1972 and were acquired before their first shed. They were fed newborn mice every five days for the first two months and then were fed weekly one mouse of appropriate size until they reached adult size which was about 18 months of age. At that time biweekly feeding was begun. The snakes were housed in 38 liter reptile tanks with newspaper as substrate and a few large flat rocks for hiding areas. The daytime temperature was generally kept between 27° C and 30° C throughout the year, although summer temperatures were occasionally as high as 33° C. Night temperatures were usually between 22° C and 25° C. No attempt was made to maintain a regular photoperiod.

The male specimen was received in mid-1974 and was kept under the same conditions as the females. Prior to this it had been maintained in a large container with heat lamps focused at particular spots which provided an opportunity for thermoregulation.

OBSERVATIONS.-- The first observed reproductive activity in the FWZP specimens was on 1 June 1976, when the female began shedding her skin. The male was courting with a series of alternating tongue flicks and head jerks along the female's dorsum. Courting activity and attempted copulation continued throughout the day and then again on 2 June 1976 without observed copulation. At 0800 h, 3 June, copulation was in effect and continued two hours. No further reproductive activity was noted until 30 August 1976 when the female again shed. Although the male attempted to stimulate the female through courting gestures, she remained coiled and appeared unreceptive. On 1 September 1976, the female was isolated off exhibit. She continued feeding weekly, and her weight appeared to increase dramatically after 1 October.

At 0800 h, 21 November 1976, 171 days after observed mating, parturition had begun and five young were present. One appeared newborn and was coiled in a thin, watery fluid. At 1830 h the female began contracting posteriorly and a juvenile's head appeared through her cloacal opening. Further contractions caused the juvenile to crawl completely from the cloaca. Fluid, but no actual membrane, could be detected. At 0930 h the last juvenile emerged as described above and had no detectable membrane. Klauber (1972) found egg teeth in embryos of this species. None was noted in this brood.

The juveniles were measured using the squeeze box technique (Quinn and Jones, 1974) and weighed on a triple beam balance on 22 November 1976. Total length varied from 214 mm to 235 mm (mean 223.4 mm) and weight varied from 9.7 g to 11.1 g (mean 10.2 g). Mean total length of the brood was 31.2 percent of the female parent's total length. Sex was determined by percentage of tail length to total length. The brood consisted of two males and five females. Percentage of tail length to total length in the two male snakes was 8.5 and 9.8 (mean 9.1) and in the five female snakes it was 5.0 to 6.8 (mean 5.9). Subcaudal counts for the males were 22 and 24 (mean 23) and ranged from 18 to 20 (mean 19.5) for the females. Coloration and pattern closely resembled that of adult snakes (Figs. 1 and 2).

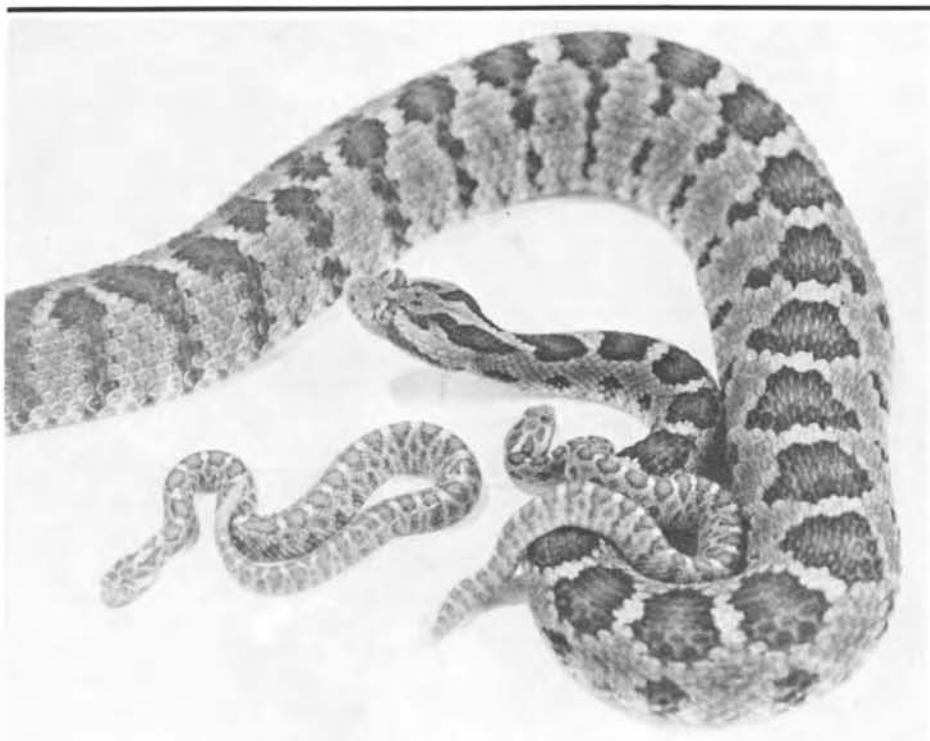


Figure 1. Adult female and two juvenile C.e. enyo several hours after birth (FWZP). Note the light colored tails of the juveniles.

The juveniles shed for the first time ten and eleven days after birth. All readily accepted newborn mice, and would strike and hold on until all movement ceased in the food item, a trait also observed in the adult snakes.

The two females in the second author's collection were placed with the adult male soon after it was acquired and the snakes were left together for a few weeks, during which the copulations were observed. Because of this, the dates given for copulation represent the last observed breeding. Female A was observed copulating with the male on 16 November 1974. Her age at that time was 27 months. On 11 May 1975, 176 days after mating, she gave birth to a litter of five which were all males. Although measurements were not recorded, the subcaudal counts of these five specimens were 24, 25, 25, 26, 27 (mean 25.4). After the young snakes had shed for the first time, they were tested for response to chemical cues from prey organisms (Burghardt, 1969). Although these snakes showed no significant behavioral differences when presented with olfactory stimuli from prey organisms or water (Chiszar and Radcliffe, in press), they immediately struck and ate newborn mice at the conclusion of the experiment.

Female A was observed mating 27 June 1975 and gave birth to a second litter of six on 21 April 1976 after a period of 299 days. It is possible that sperm retention and delayed fertilization were the causes of this extended period of time. The litter was comprised of three males, two females, and one specimen whose sex was not determined. The subcaudal scale counts on the five specimens sexed were 21 and 21 for the females and 23, 24, 26 (mean 24.3) for the males. Two were dead at birth and one died without feeding. Measurements were not recorded for this litter.

Female B was observed mating on three separate occasions. The first two occasions, 26 September 1974 and 5 July 1975, may not have resulted in fertilization. The last observed copulation was 3 August 1975. On 1 April 1976 she gave birth to a litter of two young after a period of 242 days. The birth of both snakes was witnessed (CWR) and both were in well-formed membranes from which they escaped with some struggling seven and fifteen minutes after birth respectively. The young were both males and had subcaudal counts of 24 and 26. Lengths and weights were not recorded.



Figure 2. Newborn C. e. enyo several minutes after birth (FWZP). Photo by John E. Simmons.

Lowe and Norris (1954) report four other crotalids within the range of C. enyo on the Baja mainland. These are C. ruber ruber and C. viridis helleri to the north, and C. mitchelli mitchelli and C. ruber lucasensis to the south. Although reproductive data is scant on any variety of crotalid from Baja, Klauber (1972) reported that C. r. ruber and C. viridis helleri from southern California undoubtedly mate in the spring and produce broods in the fall after an average gestation period of five months, and that this may be a few days less in the warmer areas.

Although copulation and parturition dates presented in this report are scattered, it is probable that C. e. enyo is a spring breeder in the wild but does not reproduce correspondingly in captivity regardless of conditions, as has been attributed to some reptiles (Fitch, 1970). The senior author received three apparently recently born, wild caught specimens of C. enyo furvus from a collector in October, 1974. Although measurements were not recorded, these specimens retained obvious umbilical scars and possessed only the pre-button rattle segment. In addition, it is possible that because a natural photoperiod (for Fort Worth, Texas) was available to the FWZP specimens and none to the CWR specimens, the record of 3 June to 21 November (171 days) more nearly approximates what might be expected in the wild.

ACKNOWLEDGMENTS.-- We wish to thank the staff of the Department of Herpetology, Fort Worth Zoological Park, especially Terry G. Hulsey and David B. Heckard who cared for the adult snakes in that institution. We are also indepted to Dr. David Chiszar for loaning the adult male to the second author. Upon their death, the adult and some juvenile specimens at FWZP will be placed in the collection of the University of Texas at Arlington.

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Conservation

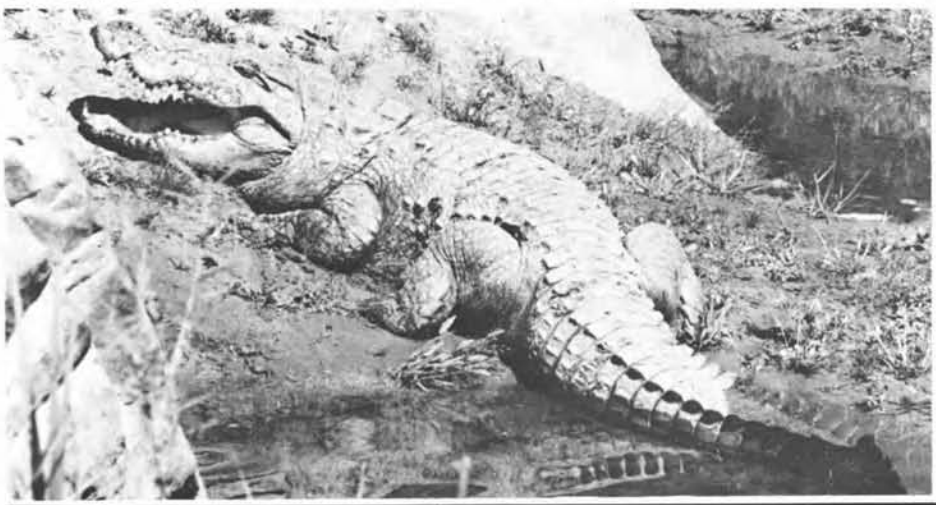
MADRAS CROCODILE BANK TRUST

The three species of India's crocodiles are seriously threatened with extinction. The freshwater Mugger (only about 220 left in Tamil Nadu), coastal Estuarine Crocodile (less than 200 on mainland India), and the Gharial of North India (only 200 on the sub-continental) will not survive unless strong and urgent measures are taken. It is most important to avoid this as they have important roles to perform in the ecology of India. One instance of their usefulness is that they feed on big predatory fish which in turn prey on the young of commercially valuable species. Thus, they are actually helpful to fisheries and do not in fact deplete fish populations as popularly believed. However, these massive reptilian remnants of the Mesozoic age are in trouble. They have been killed extensively for their skins, and their habitats have been destroyed to make room for our exploding population with the result that few crocodiles remain in India and few places remain for them to live.

The Madras Crocodile Bank Trust, a joint project of the Madras Snake Park Trust and World Wildlife Fund India will breed and rear crocodiles for conservation. The World Wildlife Fund has given Rs. 42,000/- in grants to the Madras Crocodile Bank. Most of the balance of development costs has been raised by the Madras Snake Park Trust. Resultant offspring will be offered to the State Government for re-stocking wild habitat if a guarantee is given that these will be protected. This is a vital step towards the rehabilitation of crocodiles in India.

The aims of the Madras Crocodile Bank Trust are 1) breeding and rearing crocodiles for release in the wild; 2) encouraging and stimulating research on crocodiles, the problems and economics of their survival; and 3) public education on crocodiles, their natural history and conservation.

Romulus Whitaker is the Director of the Madras Crocodile Bank Trust and A.N. Jagannatha Rao the Honorary Secretary. Other Trustees include the Wildlife Warden (Madras) and the Deputy Director (Tourism) of Tamil Nadu. Mr. Allen Vaughn of Mayabandar, Andamans and Mr. S. Bhaskar of Madras and many others have helped the project become a reality and the people of Vadanemmeli have accepted the crocodile farm in their village as their own. The Crocodile Bank will be open to public visitation. ●



RESPONSE TO LAZELL'S LETTER ON ALLIGATORS

30 March 1977

My attention was recently called to a letter written by Dr. James D. Lazell that appeared in the September 1976 issue of Herpetological Review and referred to the National Audubon Society's alligator re-stocking program conducted in 1974 and 1975. The project involved the relocating of approximately 1,500 alligators from areas in Louisiana which supported high populations to areas in Alabama and Mississippi which were void of viable alligator populations. The program was completed as previously indicated in 1975 and was considered by all participants highly successful. While I see little need to address the merits of the program in this letter, I do feel that a response is essential to a couple of erroneous assumptions made by Dr. Lazell.

First, the National Audubon Society's joint scientific staff was not established to make decisions on all activities which the Society engages in but was established to coordinate activities in areas of mutual interest. We have not heard previously from Dr. Lazell on this well-publicized project, although all interested parties nation-wide were invited to comment on the proposal. There was only one party who raised any question about the program, and once provided clarification on the methods involved, no further questions were raised. Therefore, Dr. Lazell should not feel that he had any connection with the project although he did have an opportunity to raise appropriate questions before it was initiated. Dr. Lazell stated that he believed "transport and release of coastal marsh alligators...especially to inland swamps, will be at best a cruel way to kill alligators...". That belief is totally erroneous and a careful review of previous relocation programs in the southeast as well as the Society's program very vividly demonstrates that not only do the alligators survive but reproduce as well. Before the Society released alligators in any locations, biologists examined the potential restocking areas to determine the quality of habitat involved. Records were kept on the location of the release, the number of alligators released, the sex and size of each, and they were individually tagged. From this recordkeeping, follow-up studies have shown that the survival rate has not only been high but reproduction has been observed in the re-stocked alligators as well. A number of areas have yet to demonstrate reproduction

success but this was expected since those alligators re-stocked were not yet sexually mature. If Dr. Lazell has any scientific information to dispute the Society's documents of our transplants, I hope he will share them with me.

While the Society is not opposed to the harvest of surplus alligators under carefully controlled conditions, we do not feel that marketing the hides of one species necessarily reduces the public's appetite for other similar species since most cannot tell the difference. Also, there seems to be an unfortunate trend in wearing apparel toward uniqueness. I agree with J.K. Bowler, Curator of Reptiles at the Philadelphia Zoological Garden that relocation of "alligators to suitable habitats within the natural range can hardly be equated to the introduction of exotic species."

W. CARLYLE BLAKENEY, Jr., Southeast Regional Representative, National Audubon Society, P.O. Box 786, Charleston, S.C. 29402 ●

RESPONSE TO BOWLER'S LETTER ON ALLIGATORS

2 February 1977

Inasmuch as Bowler's letter of November 18, 1976 in Herpetological Review 7 (4) regarding alligators contains several common misimpressions, I feel a response is pertinent. I would like to address Bowler's information on alligators first, and general considerations on translocation effects second.

First, alligators and ecological barriers: This is a poorly understood subject. While there may be few truly genetically isolated alligator populations, on-going studies clearly document morphological and possibly biochemical differentiation between alligator populations from different geographic areas. These indicate some restrictions in gene flow and are of considerable biogeographic and other interest. Translocations could obfuscate the natural picture and interfere with future studies.

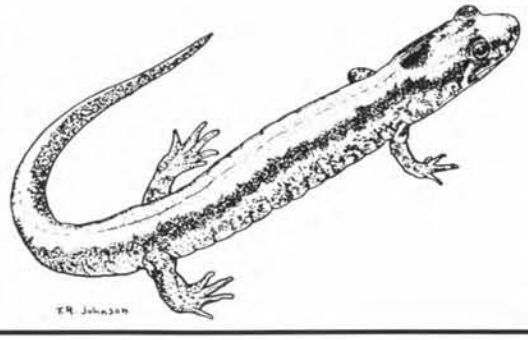
This, of course, might be a small price to pay for the recovery of the alligator over its natural range if, in fact, translocations were needed for attaining this goal. In actuality, alligators are not extirpated from any significant portions of their historic range with the possible exception of the Dismal Swamp area of southern Virginia and northeastern North Carolina (Joanen, 1974). Most, if not all, ecologically suitable areas for alligator translocation already have resident populations which could be expected to increase through natural processes and procedures if given adequate protection (even in Miami and New Orleans, where alligators do exist and occasionally cause problems).

In short, the alligator is not a beleaguered species clutching at the edge of extinction in desperate need of extensive human manipulation but, in fact, one with sizable populations over a considerable portion of its former range and in a phase of impressive and encouraging natural recovery given the protective legislation that now exists. The recent removal of some populations from the endangered species list and a reduction of others (the great majority of alligators) to a "threatened" rather than "endangered" status reflects this pattern of normal recovery.

As for translocation in general, I wish only to note that the "cruel death" of translocated animals is seldom the reason for opposing the practice. The possible introduction of new parasites and/or disease into the receiving population (geographic variation in parasites and disease within many species is well documented) and the possibility of obscuring natural patterns of variation and adaptation also need to be evaluated. From the practical view, of course, the need will usually be the deciding factor. If there is a need (which is not indicated for the alligator) there still must be careful consideration of the other factors before the best stocking population is selected. It would make poor biological sense to use Louisiana alligators to restock the Dismal Swamp or south Florida alligators to restock Oklahoma even if such undertakings were deemed desirable. I am not aware of any such considerations being given to any of the current alligator "restocking" programs with the possible exception of the Dismal Swamp State Park in North Carolina.

Although I heartily support Bowler's concern for an interest in the alligator, I feel his position on this issue is based on inadequate information of the current population levels and trends for the species and on a superficial review of the ecological implications of translocation programs.

CHARLES A. ROSS, Fish and Wildlife Service, U.S.D.I., Gainesville, Florida 32601. ●



BOWLER RESPONDS TO ROSS

8 February 1977

I am familiar with the taxonomy, ecology, and population dynamics of the American alligator, and I have personally observed the impressive recovery of this species in southeastern South Carolina. I did not mean to imply that we transport south Florida alligators to McCurtain County, Oklahoma. It may be acceptable to move surplus Louisiana alligators to Arkansas and Mississippi.

Perhaps I overreacted to Skip Lazell's letter, which was published in Herp Review 7 (3) but I feel that some biologists are unreasonably opposed to restocking and translocation programs of any kind. Such programs have saved some species of animals from extinction.

J. KEVIN BOWLER, Philadelphia Zoological Garden, 34th Street and Girard Avenue, Philadelphia, Pennsylvania 19104. ●

LEGISLATION AND RULEMAKING RE HERPS

Cooperation in conservation activities at all levels--Federal, state, local, and individual--is essential to effectively preserve endangered wildlife. It is important to keep our constituency informed of all rulemaking actions (e.g., notices of review, proposals, and final drafts), particularly those legislative activities involving reptiles and amphibians. The following information concerns "herps" affected by U.S. Federal legislation (as of 1 January 1977):

Final rulemaking (effective 7 February 1977): 50 CFR 17.

Alligator mississipiensis (American alligator)--Populations throughout Florida and in coastal areas of South Carolina, Georgia, Louisiana, and Texas have been reclassified from Endangered to Threatened status; populations inhabiting Alabama, Mississippi, North Carolina, Oklahoma, and inland portions of South Carolina, Georgia, Louisiana, and Texas are still classified as Endangered.

Final rulemaking (effective 22 February 1977): 50 CFR.

Sections 23.13 and 23.15 of the Endangered Species Convention (Federal Register Vol. 42, No. 35-Tuesday, February 22, 1977) dealing with prohibitions, permits, and exceptions relative to Endangered/Threatened international wildlife (i.e., herps).

Final rulemaking (effective 23 May 1977): 50 CFR 17.

a) Sections 17.1 and 17.2 implementing the Endangered Species Act of 1973 are amended to include wildlife designated in Appendices I, II, and III of the Endangered Species Convention (Federal Register Vol. 42, No. 35-Tuesday, February 22, 1977).

b) Section 23 added to 50 CFR involves rules covering Endangered/Threatened wildlife subject to the Endangered Species Convention (Federal Register Vol. 42, No. 35-Tuesday, February 22, 1977).

Proposed rulemaking: 50 CFR 16.

These proposed regulations will effect importation and interstate shipments of "injurious" wildlife; the proposal calls for listing a number of species of "herps" as "injurious" (e.g., several viperids, crotalids, elapids, rear-fanged colubrids, salamandrids, a pipid and bufonid)-see Federal Register, Vol. 42, No. 44-Monday, March 7, 1977.

In addition, Endangered status and critical habitat designation have been proposed for Ameiva polyps--the St. Croix ground lizard (10 January 1977) and Anolis roosevelti -- the giant anole (10 January 1977). Public comment closed on 8 April 1977 for these two forms.

THOMAS J. BERGER, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

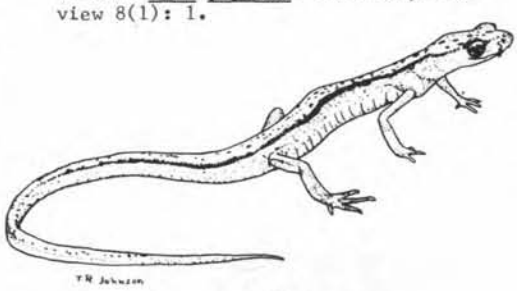
Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Conant (1956, 1975) or Stebbins (1966). Locality (use metric for distances). Date and collector(s). Identified or verified by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916. Short manuscripts are acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.



CAUDATA

AMBYSTOMA ANNULATUM (Ringed salamander). USA. ARKANSAS: Stone Co: Blanchard Springs Caverns Recreation Area, T15N, R11W, Sec. 6. 22 October 1976. D.A. Saugey. Verified by V. Rick McDaniel. Private collection of V.R. McDaniel, VRM 775-87, 810-13. First record for county and for Sylamore Ranger District, Ozark National Forest (Schuier, et al., 1972, Ark. Acad. Sci. Proc., XXVI: 61-66), and helps explain an earlier report from Sharp County (McDaniel. 1975, Herp. Rev. 6(4): 115). Further significance includes the fact that these 17 specimens were collected from a group of several hundred ringed salamanders apparently moving toward a small pond during a light rain on this night. A search of this area one week later revealed only one additional ringed salamander. Males examined had swollen cloacas, and females contained large numbers of apparently ripe eggs. The ringed salamanders were accompanied by smaller numbers of Plethodon glutinosus glutinosus, Plethodon dorsalis angusticlavius, Eurycea longicauda melanopleura, Eurycea lucifuga, and Ambystoma maculatum.

Submitted by: V. RICK MCDANIEL and DAVID A. SAUGEY, Division of Biological Science, Arkansas State University, State University, Arkansas 72467.

AMBYSTOMA GRACILE GRACILE (Northwestern salamander). USA. OREGON: Deschutes Co: 20.5 km SSW Sisters (T17S, R9E, Section 14), altitude 2000 m. Richard K. O'Hara. Oregon State University Museum of Natural History, OSU 10 724-6. Extends range eastward approximately 17 km and establishes a new county record (Snyder. 1963. Ambystoma gracile. Cat. Amer. Amph. Rept., 6). This is the first verified account of this species east of the Cascade Mountain crest.

Submitted by: RICHARD K. O'HARA, Department of Zoology, Oregon State University, Corvallis, Oregon 97331.

PLETHODON DUNNI (Dunn's Salamander). USA. WASHINGTON: Lewis Co: 6.9 km N Pe Ell. 21 March 1977. Hugh G. Hanlin. OSU Museum of Natural History, OSU 10777 - 10782 (6 specimens). First record for county and extension of range 13.8 km NE of previous northern limit. Brodie, 1970, Herpetologica 26[4]).

Submitted by: HUGH G. HANLIN, Department of Zoology, Oregon State University, Corvallis, Oregon 97331.

PLETHODON YONAHLOSSEE (Yonahlossee salamander). USA. VIRGINIA: Pulaski Co: 18 km SE Pulaski. 3 October 1976. D.W. Ogle. Verified by Richard L. Hoffman. USNM 232723. Northern extension of range and first record for county. (Highton. 1971. pp. 139-188, in P.C. Holt, ed., The distributional biota of The Southern Appalachians. Part III. Vertebrates. Res. Div. Monog. 4, V.P.I. and St. Univ., Blacksburg, Va.).

Submitted by: D.W. OGLE, Biology Department, Virginia Highlands Community College, Abingdon, Virginia 24210.

SALIENTIA

OSTEOPILUS SEPTENTRIONALIS (Cuban Treefrog). USA. FLORIDA: Indian River Co: E, SW, Central Vero Beach, 6 specimens. 8 July, 13 September, 15 September 1976. S. Myers and M. McGranahan. Florida State Museum, FSM 37686-37691. 13 August 1975. J.D. Edman and H.W. Kale, Florida Med. Entom. Lab collection, uncataloged. St. Lucie Co: Port St. Lucie. Summer 1974. G. Evans and H.W. Kale, specimen released. St. Lucie Power Plant, Hutchinson Is., S. Hill, observed only. These localities lie 141.4 km N of Broward-Palm Beach County line, the northern most known locality (Lee, 1969, Florida Natur., 42[3]: 117-120). These records suggest the population is moving northward.

Submitted by: STEVEN MYERS, Department of Biology, Florida Technological University, Orlando, Florida 32816.

RANA AREOLATA CIRCULOSA (Northern Crawfish Frog). USA. ARKANSAS: White Co: 0.7 km N Searcy, Ark. Rt. 16. 8 March 1977. M.V. Plummer. Harding College Dept. Biol., HCDB 1196-99. Extends range ca 115 km SW of nearest locality in Craighead County (Byrd and Hanebrink, 1974, Herp. Review 5[3]: 69).

Submitted by: MICHAEL V. PLUMMER, Department of Biology, Harding College, Searcy, Arkansas 72143.

SCAPHIOPUS HOLBROOKI HURTERI (Hurter's Spadefoot). USA. ARKANSAS: White Co: Searcy (T8N R7W S36). 27 March 1977. M.V. Plummer. Harding College Dept. Biol., HCDB 1239-65. Extends range ca 100 km SE of nearest locality in Stone County (Schuier, et al., 1972, Proceed. Ark. Acad. Sci. 26: 61-66).

Submitted by: MICHAEL V. PLUMMER, Department of Biology, Harding College, Searcy, Arkansas 72143.

SAURIA

ANOLIS PORCATUS (Cuban Green Anole). DOMINICAN REPUBLIC. DISTRITO NACIONAL: 5.4 km N on Carretera Duarte from jct. with Avenida Abraham Lincoln in Santo Domingo. 2 October 1976. Native collectors for Patricia G. Haneline. Museum of Comparative Zoology, Harvard University, MCZ 151539. Extends the range of this Cuban species, introduced into the Dominican Republic, approximately 8 km from "La Feria" in downtown Santo Domingo, where it was formerly believed to be confined to an area only several blocks in size (Schwartz and Thomas, 1975. Carnegie Mus. Nat. Hist. Spec. Publ. 1, p. 97).

Submitted by: PATRICIA G. HANELINE, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts 02138.

ANOLIS SAGREI (Brown Anole). USA. FLORIDA: St. Johns Co: Saint Augustine (Old St. Augustine). W end Aviles Street. 21 September 1975. R.R. Doyle. Florida State Museum, UF 34404. Extends the known range of this introduced species 240 km NE from Tampa-St. Petersburg area (Conant, 1975, A Field Guide to Reptiles and Amphibians).

Submitted by: PETER MEYLAN, Florida State Museum. Gainesville, Florida 32611.

HEMIDACTYLUS TURCICUS (Mediterranean Gecko). USA. FLORIDA: Duval Co: Jacksonville, Myrtle Avenue at Florida Gas Co. Building. April or May 1970. B.U. Mansell. Florida State Museum, UF 37275 (formerly BUM 871). This record extends the known range of this introduced species 112 km NE from Gainesville where it has been established since 1956 (King, 1959, Jour. Fla. Acad. Sci.).

Submitted by: PETER MEYLAN, Florida State Museum, Gainesville, Florida 32611.

OPHISAURUS COMPRESSUS (Island Glass Lizard). USA. FLORIDA: Wakulla Co: Shell Point. 10 August 1976. P. Moler. Florida State Museum, UF 37276. This record, along with those reported by Godley (1976, Herp. Rev. 7[3]: 122-123), indicate continuity in the range of O. compressus along the Gulf coast of Florida from St. George Island to Peninsular Florida.

Submitted by: PETER MEYLAN, Florida State Museum, Gainesville, Florida 32611.



SERPENTES

REGINA GRAHAMI (Graham's Crayfish Snake). USA. ILLINOIS: Carroll Co: Savanna, Mississippi Palasades State Park. 23 August 1970. David S. Greenfield and Harlan D. Walley. HDW collection #1095. First record from county and extends range about 96.5 km N of nearest previous record from Rock Island County (Smith, 1961, Illinois Nat. Hist. Surv. Bull. 28 [1]: 1-298). Most northern record for the species.

Submitted by: HARLAN D. WALLEY, Department of Biology, Northern Illinois University, DeKalb, Illinois 60115. ●

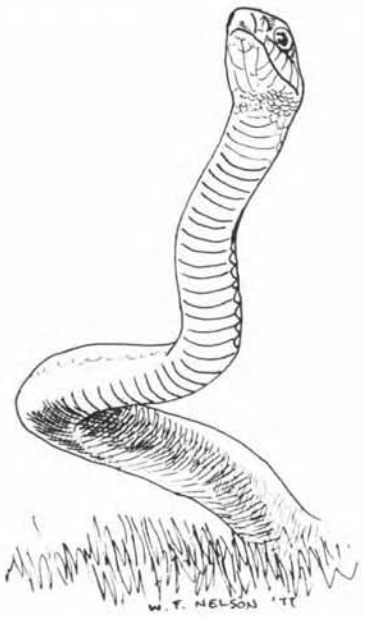
THE HERPETOFAUNA OF OSSABAW ISLAND, CHATHAM COUNTY, GEORGIA

Six species of amphibians and sixteen species of reptiles were collected or observed on Ossabaw Island from March 27 through April 2, 1975. Ossabaw Island is privately owned and its herpetofauna has not been previously described. Martof (1963, Herpetologica 19: 70-72) described the herpetofauna of nearby Sapelo Island and Anderson (1976. Herp. Rev., 7[4]: 179-180), the herpetofauna of Jekyll Island. Ossabaw Island is separated from the mainland by an extensive salt marsh. Specimens collected were deposited in the American Museum of Natural History.

AMPHIBIANS: Eurycea quadridigitata (AMNH 95796-98) was abundant throughout the island under moist decaying logs; Plethodon glutinosus glutinosus (AMNH 95799 - 800) was found under decaying logs on the south end of the island; Bufo terrestris (AMNH 95801-03) was abundant throughout drier areas of the island and is often found in hollows at the bases of standing trees; Gastrophryne carolinensis (AMNH 95814) was found after a midday rain under a board on the south end of the island; Hyla squirella (AMNH 95804-05) was abundant in trees and moist leaf litter and large choruses were heard at night; Limnaoedus ocularis (AMNH 95806-13) was found in moist situations throughout the island. Very abundant, large choruses were heard at night.

REPTILES: Alligator mississipiensis. Three individuals were observed at midday in Gator Pond. All had total lengths under two meters; Anolis carolinensis carolinensis (AMNH 14581 - 82) was abundant throughout the island: Cnemidophorus sexlineatus sexlineatus (AMNH 114590) was found DOR on a road along the southeast section of the island; Eumeces inexpectatus (AMNH 114588-89) was very abundant and was usually found under woodpiles around edges of marshes; Scincella lateralis (AMNH 114582-87) was extremely abundant, especially in moist leaf litter; Ophisaurus ventralis (AMNH 114580) was found on south end of the island in forest; Cemophora coccinea copei AMNH 114591) was found under a board in sand, adjacent to a beach; Coluber constrictor priapus (AMNH 114592-93) was found abundantly in moist woodlands, dry, sandy areas, and woodpiles; Crotalus adamanteus (according to Mrs. Clifford B. West, the owner of Ossabaw) is occasionally seen on the island. Mrs. West showed me two large skins of eastern diamondback rattlesnakes which had been shot on the island; Lampropeltis getulus getulus (AMNH 114594-95 was the most abundant serpent encountered, most often found in moist situations near water; Opheodrys aestivus (AMNH 114596) was found on the west border of Goose Pond; Thamnophis sauritus sackeni (AMNH 114597-98) was found around the edge of small, temporary freshwater pool. Both were active when observed and may have been foraging for Limnaoedus ocularis which was abundant around the perimeter of the pool; Thamnophis sirtalis sirtalis (AMNH 114599-600) was very abundant, especially in brush piles. One was palped and contained two large Bufo terrestris; Caretta caretta caretta nestings on the beaches of Ossabaw are being studied by the University of Florida and the University of Georgia Institute of Natural Resources; Dermochelys coriacea coriacea. Mrs. West showed me a large leatherback skull taken from a turtle found dead on an Ossabaw beach; Chrysemys scripta scripta (AMNH 114601) shells were found in vegetation around Gator Pond.

Submitted by: STEVEN B. RINGLER, Bard College, Annandale-on-Hudson, New York 12504. ●



DISTRIBUTIONAL RECORDS OF AMPHIBIANS AND REPTILES FROM PUERTO RICO

We have taken Anolis occultus in two areas in the northern limestone periphery of PUERTO RICO: 10 km airline W. Manati, 50 m (RT 3759-62) and 2 km S Pueblito de Ponce, Montanas Aymamon, ca. 200 m (RT 3879-84). The present records markedly extend the known geographic, elevational, and ecological ranges of the species, heretofore known only from upland forests above 600 m. Although the natural vegetation of the northern coastal plain is termed the "moist limestone forest" (Little and Wadsworth, 1964, U.S. Dept. Agric. Handbook No. 249), drainage factors on the mogotes result in vegetation with a xerophytic character, including for example the trees Bursera simaruba and Bucida buceras. Also at the locality 10 km airline W Manati we obtained Sphaerodactylus klauberi (RT 3695) and Diploglossus pleei (RT 3698-3708), both extreme peripheral and low elevation records for otherwise interior, upland species.

On the xeric southern coastal periphery, we obtained Bufo lemur (RT 4075) 6 km airline NNW Santa Isabel (xeric pasture-woods), and Mabuya mabouya (RT 4215) about 2 km by road NE Descalabrado (xeric woods and second-growth scrub at edge of cultivation). Both of these species are known on Puerto Rico from relatively few records. Ameiva wetmorei (RT 4170) taken in the scrubby hills just north of Punta Cuchara (ca. 4 km airline SW Ponce) constitutes an eastward range extension on the mainland of Puerto Rico.

Submitted by: RICHARD THOMAS and KIM R. THOMAS, Department of Biology, University of Puerto Rico, Rio Piedras, Puerto Rico 00931. ●

NEW DISTRIBUTIONAL RECORDS FOR AMPHIBIANS AND REPTILES FROM THE PROVINCES OF CATAMARCA, LA RIOJA, AND CORDOBA, ARGENTINA

During the course of field work for the Desert Scrub Subprogram of the International Biological Program, numerous reptiles and amphibians were collected from the provinces of Catamarca, La Rioja, and Cordoba. The species listed here represent significant range extensions and, with the exception of Pleurodema nebulosa and Homonota horrida all represent the first recorded occurrence of the species in the province. Catalogue numbers refer either to the Texas Natural History Collection (TNHC) or the Carnegie Museum (CM).

PLEURODEMA NEBULOSA. LA RIOJA: Mazan (TNHC 45105-108) and Rio Salada 15 km S of Mazan (TNHC 44919); CATAMARCA: Rt. 62, 5 km W of Andalgala (TNHC 44950-965) and Rt. 1, from 4 to 35 km S of Andalgala (TNHC 45115-125, 45126-45135, and 45077-45113). The preceeding specimens represent a range extension of approximately 70 to 110 km eastward from that previously reported by Barrio (Physis, 1964, 24: 471-489). HOMONOTA UNDERWOODI. LA RIOJA: Rt. 38, 15 km W of Chamical (TNHC 46801); CATAMARCA: Rt. 62, 6 km W of Andalgala (TNHC 44941) and Rt. 1, 4 to 33 km S of Andalgala (TNHC 46865, 46720, 46867, 46694, and 44932). The Andalgala records represent a range extension of approximately 390 km to the northeast from that reported by Kluge (1965, Bull. S. Calif. Acad. Sci. 64: 127-131). HOMONOTA HORRIDA. CATAMARCA: Andalgala: (TNHC 45104), Rt. 62, 6 km W of Andalgala (TNHC 44938), Rt. 1, 17 km S of Andalgala (TNHC 46734-435) and Poman (TNHC 46709-712, 46900, 46692, and 44932). These are the first specimens reported from the departments of Andalgala and Poman. GYMNOPHTHALMUS RUBRICAUDUS. CATAMARCA: Rt. 60 approximately 15 km S of the Junction of Rt. 1, in the Sierra de Ambato (CM 63617). This is the first specimen reported from Catamarca. LEPTOTYPHLOPS UNGUIROSTRIS. CORDOBA: Rt. 60, 5 km S of Totoralejas (TNHC 46675), CATAMARCA: Rt. 62, 6 km W of Andalgala (CM 61537), Rt. 1, 12 km S of Andalgala (TNHC 46679, 46688, and CM 61538) and Rt. 1, 14 km S of Andalgala (CM 61539). These are the first specimens actually reported from Catamarca and Cordoba. The species has previously been reported from San Juan and Santiago del Estero (Peters and Orejas-Miranda, 1970, U.S.N.M. Bull. No. 297: 1-347). LEPTOTYPHLOPS BORRICHIANUS. LA RIOJA: Chamical: (TNHC 46702). This is the first record for the province of La Rioja and represents a range extension of approximately 320 km northeast from the vicinity of Mendoza (Peters and Orejas-Miranda, 1970, U.S.N.M. Bull. No. 297: 1-347). LEPTOTYPHLOPS MELANOTERMUS. CORDOBA: Cordoba (TNHC 46701), CATAMARCA: Rio Poman 4 km E of the town of Poman (TNHC 44821). This species has been previously recorded from northern Argentina as far south as Santa Fe (Peters and Orejas-Miranda, 1970, J.S.N.M. Bull. No. 297: 1-347). THAMNODYNASTES SP. CATAMARCA: Cuesta de Minas Capillitas (CM 61549), Minas Capillitas (TNHC 44843), La Banderia. Albalos, Baez, and Nader (1964, Acta Zool. Lillo. 20: 211-283) reported on one specimen of Thamnodynastes strigilis from Santiago del Estero, but the genus has not been reported from Catamarca. PHIMOPHIS VITTATUS. LA RIOJA: Rt. 38, 4 km E of Chamical (TNHC 46904); Rt. 38, 12 km W of Chamical (TNHC 46878), CATAMARCA: Andalgala (TNHC 44940, 61544), Rt. 1, 14 km S of Andalgala (TNHC 44834), Rt. 1, 20 km S of Andalgala (TNHC 46915), Rio Canada (TNHC 44858), Poman (CM 61546) and junction of Rt. 1 and Rt. 60 (TNHC 46864). Peters and Orejas-Miranda (1970, U.S.N.M. Bull No. 297: 1-347) reported this species from Entre Rios and Santiago del Estero northward in Argentina. The Chamical specimens represent a range extension of approximately 280 km to the WSW.

Submitted by: ARTHUR C. HULSE, Department of Zoology, University of Texas, Austin, Texas 78712. Present address: Biology Department, Indiana University of Pennsylvania, Indiana, Pennsylvania 15701. ●

DISTRIBUTIONAL NOTES ON KIRTLAND'S WATER SNAKE, CLONOPHIS KIRTLANDI (KENNICOTT)

This note reports new locality records which extend the range of this species in ILLINOIS, INDIANA, KENTUCKY, and OHIO. Abbreviations are: KU, Museum of Natural History, University of Kansas, Lawrence; RSF, personal collection of R.S. Funk; UCM, University of Colorado Museum, Boulder; and UMMZ, University of Michigan Museum of Zoology, Ann Arbor.

ILLINOIS: Coles Co: Lake Paradise spillway, 9 km SW Mattoon. 16 July 1976. R.S. Funk. Verified by J.K. Tucker. RSF 3665. Extends the range 24 km SW from nearest record in Charleston, Coles County (Smith, 1961, Ill. Nat. Hist. Surv. Bull. 28[1]: 78-79).

INDIANA: Orange Co: Valeen. April 1972. D. Cassady. UMMZ 131130. Extends the range 53 km SW from nearest Indiana record (Muskatatuk lowlands near Little York) in Washington County (Minton, 1976, Indiana Acad. Sci. Monogr. 3: 1-346) and 53 km NNW from populations in New Albany, Floyd County, Indiana (Conant,

1943, Am. Midl. Nat. 29[2]: 313-341).

KENTUCKY: Campbell Co: May 1959. G.T. McDuffie. KU 144717. Kenton Co: Ludlow. October 1960. D.E. Haggard. KU 144716. The only previous Kentucky records documented by specimens are in Jefferson and Ohio counties over 145 km SW (Conant, 1943, Am. Midl. Nat. 29[2]: 313-341). These records extend the range south of the Ohio River; nearest previously reported populations are in Cincinnati, Hamilton County, Ohio, north of the Ohio River.

OHIO: Cuyahoga Co: Cleveland. May 1945. KU 82695. Extends the range 80 km NE from New London, Huron County (Conant, 1943, Am. Midl. Nat. 29[2]: 313-341). Wayne Co: 5.2 km N. Rittman. 28 April 1960. J. Dolan. UCM 35866. Extends the range 56 km E from New London, Huron County (Conant, 1943. Am. Midl. Nat. 29[2]: 313-341) and 59 km S of Cleveland record reported above. These new Ohio records are the nearest to the probably disjunct populations 150 k m SE in Pennsylvania.

Acknowledgements: We thank S. Wu (UCM) and A.G. Kluge (UMMZ) for making specimens available for examination.

Submitted by: JOHN K. TUCKER and RICHARD S. FUNK, Department of Biological Sciences, Illinois State University, Normal, Illinois 61761; and JOSEPH T. COLLINS, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045. ●

News Notes

HOBART SMITH RECOGNIZED

The University of Colorado has awarded its fifty-second Lectureship on Research and Creative work to Hobart M. Smith. Hobart Muir Smith is one of the leading herpetologists in the world, noted primarily for his massive and distinguished contributions to the classification and evolutionary biology of reptiles and amphibians. An internationally recognized specialist on the herpetofauna of Mexico, he has also made important contributions to the fields of comparative anatomy, paleontology, biological bibliography and biography, ecology, and animal behavior.

This breadth of knowledge is manifested in Dr. Smith's publication record of approximately 30 books and 700 articles. One of his major achievements is The Herpetology of Mexico, a now classic document which is being revised and expanded. Another large-scale project is the preparation of an index to the world scientific literature on Mexican herpetology. To date, this has resulted in four published volumes, one almost completed volume, and four in the planning stage. The first two published volumes alone contain a list of approximately 9,000 references, and the last two about 98,000 citations derived from those references plus about 1,500 supplementary ones. His textbook of comparative anatomy is a unique contribution. First published nearly 30 years ago, it remains a standard reference book.

As teacher, Dr. Smith is able to direct students to research projects which promise to lead to new and significant findings. This advice is extremely useful in the training of undergraduate and graduate students and in the development of young faculty as well as in the systematic advancement of science.

Hobart Smith received graduate degrees from the University of Kansas and joined the University of Colorado faculty in 1968, serving as chairman of the Department of Environmental, Population, and Organismic Biology from 1970 to 1974. Hobart Smith is a scholar's scholar, a gentleman and a gentle man. The Lectureship not only honors him but brings credit to the award.

ANDERSON MEMORIAL ESTABLISHED

The tragic and untimely death of Jim Anderson has left us all with a sense of great personal and professional loss. His former colleagues in the Department of Zoology and Physiology at Rutgers are now establishing a James D. Anderson Memorial Lecture Series in his honor whereby eminent ecologists will be invited to speak on campus on a regular basis. This form of tribute is particularly appropriate in view of Dr. Anderson's commitment to teaching and research in ecology. Contributions for a fund to support this endeavor are needed.

Checks should be made out to The Rutgers University Foundation and forwarded to:

The Rutgers University Foundation
191 College Avenue
New Brunswick, New Jersey 08903

This appeal is outside of the normal Annual Fund appeal of the Foundation. Your contribution is tax deductible, of course.

FUTURE SSAR MEETINGS

1978--SSAR 21st Annual Meeting in May-June at Arizona State University, Tempe. M. J. Fouquette, SSAR Local Meeting Chairman.

1979--SSAR 22nd Annual Meeting in August at the University of Tennessee, Knoxville.

SSAR FACSIMILE COMMITTEE

The Society for the Study of Amphibians and Reptiles is pleased to announce the 1977 Editorial Committee and staff for its series Facsimile Reprints in Herpetology.

Kraig Adler, Editor, Langmuir Laboratory, Cornell University, Ithaca, New York 14853 (USA).

Jaime Villa, Assistant Editor, Apartado, Postal 427, Managua (Nicaragua).

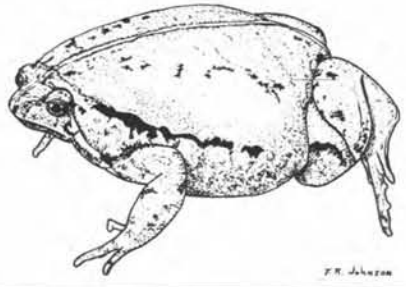
Editorial Committee: Eddie M. Ashmore, Louisville, Kentucky (USA); Jan Caldwell, Biological Survey of Kansas (USA); Harold G. Cogger, The Australian Museum (Australia); Federico Medem M., Estacion de Biologia Tropical (Colombia); Gunther Peters, Museum fur Naturkunde der Humboldt-Universitat (Germany); Rolande Roux-Esteve, Museum National d'Histoire Naturelle (France); and Jay M. Savage, University of Southern California (USA).

HERP STAMP BOOK AVAILABLE

Lower Vertebrates: Fishes, Amphibia and Reptiles on Stamps of the World is a handbook prepared by George A. Bearse, Willard F. Stanley, Maynard S. Raasch, Ursula Stahl, E.O. Bookwalter, Robert E. Gordon and Malvin L. Skaroff, and contains a taxonomic listing and a country listing in conformity with the style of previous biological stamp handbooks on Birds and Mammals.

The checklist of amphibians and reptiles presents issues from 114 stamp producing entities. Among the lists are to be found 29 stamps depicting 23 species of Frogs and Toads, five species of Salamanders on 11 stamps, 20 species of Turtles on 109 stamps, 51 species of Lizards on 84 stamps, 57 species of Snakes on 126 stamps, 12 species of Crocodiles on 127 stamps plus 38 fossil species on 61 stamps.

The volume is 120 pages including hundreds of stamp illustrations on 8 full-page plates and an artistic cover. Regularly priced at $8, introductory orders are now being accepted at a special price of only $7 from the American Topical Association, 3308 North 50th Street, Milwaukee, Wisconsin 53216.



DAS TIERREICH ISSUE AVAILABLE

Duellman, William E. 1977. Liste Der Rezenten Amphibien und Reptilien: Hylidae, Centrolenidae, Pseudidae. Das Tierreich, Lief. 95, pp. i-xix, pp. 1-225. Walter de Gruyter & Co., D-1000 Berlin 30, Genthiner Strasse 13, Germany. 280 DM (=$115.70).

This checklist of the 40 genera and 603 species of hylid, centrolenid, and pseudid frogs covers the literature through 1974. Included in the accounts of each species and subspecies are type localities, location and catalogue numbers of type specimens, all nomenclatural combinations, authorities for all synonymies and for current usage, statements of geographic distribution, and references to pertinent literature. The volume is completely indexed for all generic and trivial names.

SECOND ANNUAL REPTILE SYMPOSIUM

Announcing the 2nd Annual Reptile Symposium on Captive Propagation and Husbandry sponsored by Baltimore Zoological Society, Catoctin Mountain Zoological Park, Zoological Society of Philadelphia, and Reptiland. This year's Symposium is hosted by Northern Ohio Association of Herpetologists, Cleveland Museum of Natural History, and Case Western Reserve University. It is to be held in Cleveland, Ohio on the grounds of Case Western Reserve University and Cleveland Museum of Natural History on Thursday, Friday, and Saturday of June 23, 24, and 25.

Preregistration can be obtained by writing to: Bob Johnson, Attn: Reptile Symposium, c/o Baltimore Zoo, Druid Hill Park, Baltimore, Maryland 21217.

MEXICAN FAUNA CONFISCATED

The United States Fish and Wildlife Service has recently confiscated a variety of Mexican fauna at the port of entry in El Paso, Texas.

Among those specimens confiscated were the following: 30 Mexican tarantulas; 11 Mexican boa constrictors; 2 Long-nosed snakes; and 1 Mexican lyre snake.

Arrangements can be made through the El Paso Zoological Park for relocating any or all of the above specimens in zoological facilities in the United States. All transactions are to be considered temporary; but it is hoped that the cooperating institutions will be made permanent recipients of individual specimens at a later date, pending the result of the litigation. For more information contact: Raymond Arras, Director, El Paso Zoological Park, Evergreen & Paisano, El Paso, TX 79905.

ERRATA FOR HR 7(2)

Page 84. Ontogenetic shifts in food habits of a crayfish eating specialist. Regina alleni (Serpentes: Colubridae). Line 3, "(200 mm TL)" should read "(< 200 mm TL)"; lines 6-7, "Adult prey items identified in juvenile R. alleni feed primarily on hard-shelled procambarid crayfish." should read "Adult R. alleni feed primarily on hardshelled procambarid crayfish."

ERRATA FOR HR 7(3)

Distances in the following Geographic Distribution reports should be converted to correct kilometer values by multiplying the published distances by 0.617:

French, T. W. Gyrinophilus porphyriticus, p. 122.
Garton, J.S. and B.L. Sill. Seminatrix pygaea, p. 123.
Godley, J.S. Ophisaurus compressus, p. 122.
McCoy, C.J. Storeria dekayi texana, p. 123; Thamnophis radix haydeni, p. 124; Tropidoclonion lineatum, p. 124.
Means, B. Heterodon nasicus gloydi, p. 123.
Stephan, D.L. and A.C. Braswell. Manculus quadridigitatus, p. 125--44 km distance is correct as published.

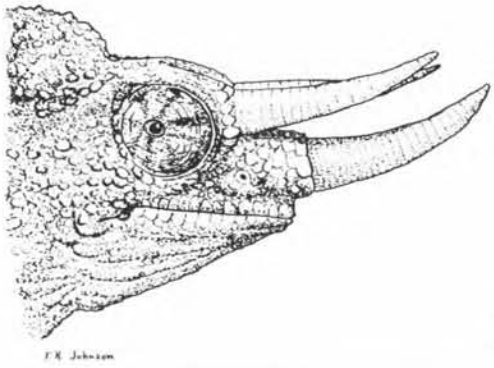
ERRATA FOR HR 8(1)

Page 1, Table of Contents: "In Memorium" should read "In Memoriam."

Page 5, col. 1, para. 2, last line "369)." should read "1960: 369)."

Page 5, col. 2, para. 3, lines 5-6 + photo caption: "Miniola" should read "Mineola."

Page 7, cols. 2-3: The contributing members listed should appear with the sustaining members above "SSAR Conservation Fund Grows."



Regional Society News

ST. LOUIS HERPETOLOGICAL SOCIETY

In the past, the SLHS has undertaken a number of special projects to promote the conservation of amphibians and reptiles, educate the novice herpetologist in the proper care and housing of amphibians and reptiles in captivity, and has promoted the union of professional and amateur herpetologists for the betterment of the field.

Presently, the St. Louis Herpetological Society has published a "snake" poster to help educate the public to the fact that so many of our harmless snakes are needlessly killed. It is the hope of the organization that the poster will show that snakes are an interesting and beneficial part of our outdoors. These attractive posters measure 11 x 16 inches, are printed on heavy white, yellow, or green paper, and can be ordered for 50¢ each from:

The St. Louis Herpetological Society
P. O. Box 9216
St. Louis, Missouri 63117

The SLHS is working with the local Natural History Museum to establish educational museum displays on a wide range of herpetological subjects. The theme for the first joint-effort display will be: "The Salamanders of the Missouri Ozarks." Sometime this summer, the SLHS will hold another auction to raise funds for future projects. Books, herpart, aquariums, cages, snake hooks, photographs, animal food, etc. are some of the items to be auctioned.



Please send news information on YOUR regional herpetological society to the section editor (see inside front cover for address). Include new projects, special educational programs, fund raising efforts, etc.



For: Name _____

Street _____

City _____ State _____ Zip _____

Check one: ___Individual ($10.), ___Family ($12.50), ___Junior under 18 years of age ($7.50), ___Corresponding ($6.).

We'll send you a gift announcement to present to the new member.

List any additional gift memberships on a separate sheet. Return with your check or money order to:

YOUR NAME _____

STREET _____

CITY _____ STATE _____ ZIP _____

Membership Secretary
CHICAGO HERPETOLOGICAL SOCIETY
2001 North Clark Street
Chicago, Illinois 60614

A few extra copies of the patrons' set of Holbrook color plates are being offered for sale. All proceeds will be assigned to the SSAR Conservation Fund, which is used to further the Society's activities in the conservation of amphibians and reptiles.

Plates measure 10 by 13 inches and are printed on heavy paper stock suitable for framing. Supplies of many plates are quite limited; orders will therefore be filled on a first-come, first-served basis. Prices reflect availability.

JOHN EDWARDS HOLBROOK, watercolor portrait by David M. Dennis (1976), artist's proof signed by Mr. Dennis but unnumbered	$25.00
EASTERN BOX TURTLE, Terrapene carolina	8.00
DIAMONDBACK TERRAPIN, Malaclemys terrapin	10.00
RIVER COOTER, Chrysemys c. concinna	10.00
SLIDER, Chrysemys c. hieroglyphica	10.00
HAWKSBILL TURTLE, Eretmochelys imbricata	10.00
FENCE LIZARD, Sceloporus undulatus	10.00
COLLARED LIZARD, Crotaphytus collaris	10.00
COAST HORNED LIZARD, Phrynosoma coronatum	10.00
FIVE-LINED SKINK, Eumeces fasciatus	8.00
CANEBRAKE RATTLESNAKE, Crotalus horridus atricaudatus	8.00
EASTERN CORAL SNAKE, Micrurus fulvius	8.00
RAINBOW SNAKE, Farancia erytrogramma	8.00
BANDED WATER SNAKE, Natrix fasciatus	10.00
EASTERN HOGNOSE SNAKE, Heterodon platyrhinos	10.00
PICKEREL FROG, Rana palustris	10.00
GRAY TREEFROG, Hyla versicolor	10.00
GREAT PLAINS TOAD, Bufo cognatus	10.00
BLACK-BELLIED SALAMANDER, Desmognathus quadramaculatus	10.00
MUDPUPPY, Necturus maculosus	8.00

All shipments will be sent postpaid. Send order with payment to Dr. Henri C. Seibert, Morton Hall, Ohio University, Athens, Ohio 45701, U.S.A. Make checks payable to "SSAR"; receipts sent on request only.

SSAR TREASURER'S REPORT FOR 1976

Income

Dues	$10,766.80
Subscriptions	5,324.00
Contributions	1,070.75
Royalties (Evol. Biol. Anurans)	101.62
Book & Back issues sales	*21,659.63
Rebates	37.59
Reprint sales and advertisements	2,893.34
Interest	2,377.14
SSAR Catalogue of American Amphibians and Reptiles	7,133.58
Subtotal	$51,364.45
Balance in account 1 January 1976	51,476.10
TOTAL	$102,841.15

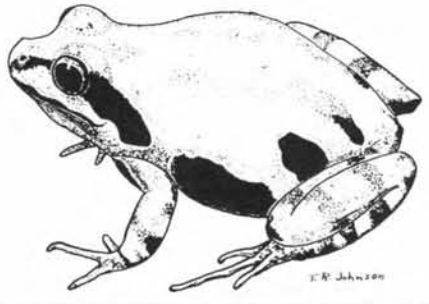
Disbursements

Journal of Herpetology	$14,583.12
Herpetological Review	3,588.46
Herp Circulars	1,202.50
Small facsimile reprints	0
Book facsimile reprints	8,398.77
Expenses of Chairman	26.52
Expenses of Secretary	221.07
Expenses of Elector	325.09
Expenses of Treasurer	820.04
Expenses of Publications Secretary	3,770.77
Expenses of Asst. Publications Secretary	377.31
Contribution Zoological Record	100.00
SSAR Student Prize	100.00
SSAR Catalogue of Amphibians and Reptiles	6,063.00
	$40,063.00
Balance as of 1 January 1977	$62,778.15

*Includes $8939. advance sales of Holbrook facsimile.

HENRI C. SEIBERT
SSAR Treasurer
10 February 1977

(Editors Note: A detailed report can be obtained from the SSAR Treasurer.)



Current Literature

As of January, 1977, approximately 70 searchers are scanning 400 journals. Titles will be published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR. Any correspondence concerning the Current Literature Project should be sent to

Richard D. Worthington
Current Literature
Department of Biological Sciences
The University of Texas at El Paso
El Paso, Texas 79968

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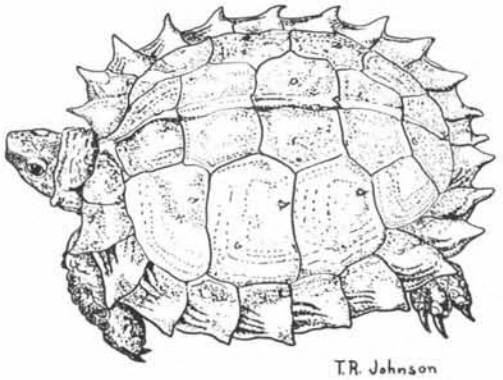
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ACUNA, M. L. Contribution to the comparative cytomorphology of hylid frogs from Venezuela.

ACUNA, M. L. Hematological observations on some anurans from Venezuela.

ANDERSEN, M. L. Myological studies on the relationship between the anuran prepollex and prehallux.

ANDREWS, R., RAND, S. and S. GUERRERO. Regulation of population size in the tropical lizard, Anolis limifrons.

ASHTON, R. E., ASHTON, P. and D. DEITZ. Investigations into the natural history of Pseudacris ornata in north-central Florida: preliminary report.

BAEZ, A. M. and Z. B. DE GASPARINI. History of the South American herpetofauna: a paleontological approach.

BARTLETT, G. R. Phosphate compounds in reptilian red cells.

BOGART, J. P. Evolutionary relationships of frogs in the neotropical family Dendrobatidae.

BRANHAM, A. E. and J. C. LIST. Development of the urostyle during metamorphosis.

BUTLER, J. A. Physiological and behavioral mechanisms that relate to the feeding strategies of Regina septemvittata during environmental temperature stress.

CHAMBERS, R. C. Energetics in different life histories of Ambystoma tigrinum.

COLLIER, A. D. Cinematographic technique in herpetological education.

CUPP, P. V., JR. Aggressive behavior in the green salamander, Aneides aeneus.

DENNY, W. D., BURGHARDT, G. M., and R. P. SAUNDERS. Effect of tongue removal on the feeding behavior of an adult garter snake (Thamnophis sirtalis).

DREWES, R. C., PUTNAM, R. W. and O. M. SOKOL. Integumentary structures correlated with uricotely in an African tree frog.

DURANT, P. Ecological distribution of the salientian fauna of the Merida Andes.

DURANT, P. and J. W. DOLE. Amphibian ecology of the Venezuelan Andes.

EARNHART, V. and H. E. SMITH. A comparison of thermal time constant of aquatic and terrestrial turtles.

ECHTERNACHT, A. C. A zoogeographic analysis of the herpetofauna of the West Indies.

EDWARDS, J. L. Terrestrial locomotion in salamanders: gait analysis.

FITCH, H. S. and V. R. FITCH. Structure and function of anole dewlaps.

GORMAN, G. Sample size in taxonomic electrophoretic studies: an empirical analysis.

GORZULA, S. J. The ecology of the spectacled caiman in the Venezuelan Guiana.

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HODL, W. Distress calls in central Amazonian frogs.

HODL, W. Call differences and calling site segregation in anuran species from central Amazonian floating meadows.

JACKSON, J. Differentiation in the genera Enyalius and Strobilurus (Iguanidae): implications for Pleistocene climatic changes in eastern Brasil.

JUTERBOCK, J. E. The taxonomic status of Desmognathus welteri Barbour and a comparison with two sympatric congeners.

KAPLAN, R. H. and M. L. CRUMP. The non-cost of brooding in Ambystoma opacum.

KOCHMAN, H. Differentiation and hybridization in the Natrix fasciata complex (Reptilia: Serpentes): a nonmorphological approach.

LESCURE, J. Biogeography of the amphibians in the oriental region of the Guianas.

MIDDENDORF, G., III. and W. M. POST, III. The energetic basis of social behavior: lizard social structures.

MILLER, K. Activity metabolism in the mudpuppy, Necturus maculosus.

PACKARD, G. C., TRACY, C. R. and M. J. PACKARD. The dynamics of water exchange by eggs of painted turtles (Chrysemys picta).

PACKARD, M. J., TRACY, C. R. and G. C. PACKARD. Scanning electron microscopy of eggs of squamata.

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ROSSMAN, D. A. and D. L. CUNDALL. Comparative cranial osteology of Farancia and Pseudoeryx: systematic implications.

SATTLER, P. W. and J. S. MECHAM. Hybridization in spadefoot toads.

SAVITZKY, A. H. The elaboration of venom delivery systems in snakes.

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SMITH, E. N. Growth and movement of alligators in south Texas.

THOMAS, R.A. Genus or subgenus: that is the question.

TRAUTH, S.E. Collection of hibernating Cnemidophorus sexlineatus (Lacertilia: Teidae) from various parts of its range.

VELOSO, M., A., and M. PENNA. Structural patterns of spontaneous and evoked calls in the Bufo spinulosus group (Amphibia: Bufonidae).

VIGLE, G.O. The history and distribution of an introduced population of Lacerta muralis.

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WHETSTONE, K. Platysternon and the evolution of chelydrid turtles.

WIEL, M.R. and R.D. ALDRIDGE. The effects of temperature on the reproductive cycle of the male water snake (Natrix sipedon).

WILLIAMS, J., BAKER, W., PHILLIPS, R. and G. VANDOBOS. Effect of thyroid hormone on hepatic cell proliferation and turnover in the bullfrog tadpoles.

Symposium Papers
South American Herpetofauna

CEI, J.M. Temperate herpetofaunas: Patagonia.

DIXON, J.R. Origin and distribution of reptiles in lowland tropical rainforests of South America.

DUELLMAN, W.E. Origin, evolution and dispersal of Andean herpetofauna.

FORMAS, R.C. The herpetofauna of the austral forests.

GALLARDO, J.M. Composition, distribution and origin of the Chacoan herpetofauna.

HAFFER, J.H. Quaternary biogeography of tropical lowland South America.

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LAURENT, R.F. Herpetofaunal relationships of South America and Africa.

LEON, J.R. The herpetofauna of the llanos and assorted non-forest regions of northern South America.

LOVEJOY, T.E. Refugia, refuges and minimum critical size: problems in conservation of the neotropical herpetofauna.

LYNCH, J.D. The amphibians of lowland tropical forests of South America.

MULLER, P. The herpetofauna of the Brasilian shield.

REIG, O.A. The Quaternary history of temperate South America.

ROSEN, D.E. Distribution patterns, cladistic patterns, paleogeography and biotic history.

SIMPSON, B.B. Quaternary biogeography of the South American highlands.

TYLER, M.J. Herpetofaunal relationships of South America with Australia.

WRIGHT, J.W. Biogeography of the herpetofauna of the deserts of western South America.

Special Session on Community Ecology

BROWN, W.S. and W. S. PARKER. Snake communities: a review with suggestions for research.

CAMPBELL, H.W. Analysis of the herpetofauna of Florida Longleaf Pine-Turkey Oak (Sandhill) habitat.

CAMPBELL, H.W. and S. P. CHRISTMAN. Techniques for herpetofaunal community analysis.

CHRISTMAN, S.P. The herpetofauna of Florida Sand-Pine Scrub.

CREUSERE, F.M. and W. G. WHITFORD. Variation of diel activity of a Chihuahuan Desert lizard community.

CRUMP, M.L. The significance of reproductive ecology in frogs and its relevance to the study of anuran communities.

DUELLMAN, W.E. The acoustical niche: auditory resource partitioning in anuran communities.

FITCH, H.S. Partitioning of food resources in snakes of the University of Kansas Natural History Reservation.

HEATWOLE, H. A review of structuring in herpetological communities.

LILLYWHITE, H.B. Tracking as an aid in the study of snake communities.

MAUTZ, W.J. Utilization of cave resources by a lizard community.

NELSON, C.E. Amphibian communities in southern Indiana: factors influencing species composition in ponds.

NELSON, C.E. Comparison of "naturalistic" and quadrat approaches in the analysis of a Brasilian frog community.

PEFAUR, J.E. and W.E. DUELLMAN. Community structure in High Andean herpetofaunas.

REYNOLDS, R. Use of a mammalian resource by a Chihuahuan snake community.

SCOTT, N.J., JR. The herpetofauna of forest litter plots from Cameroon.

SCOTT, N.J., JR. and H.W. CAMPBELL. The status of studies of herpetological communities and suggestions for future research.

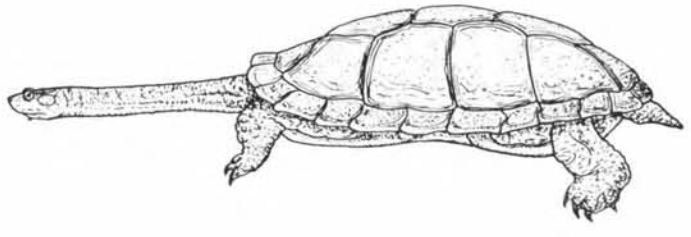
SMITH, C.R. Food resource partitioning of burrowing Sand-Pine Scrub reptiles.

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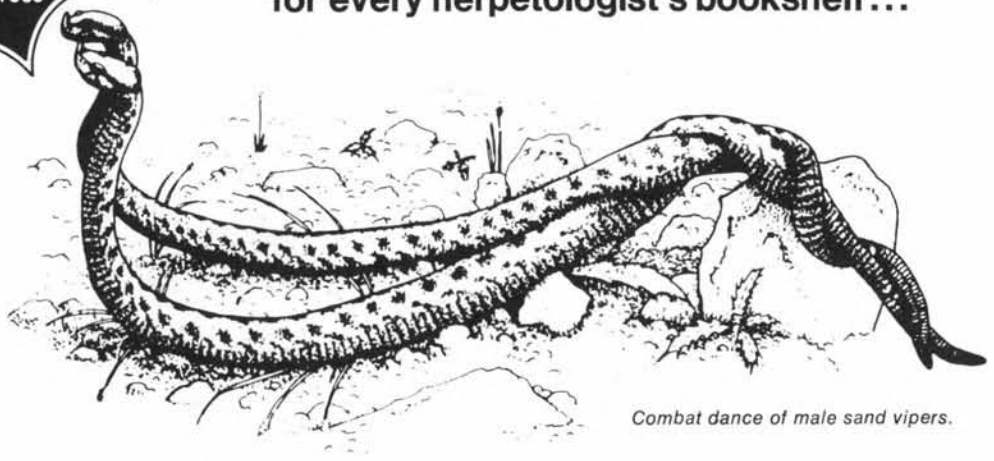
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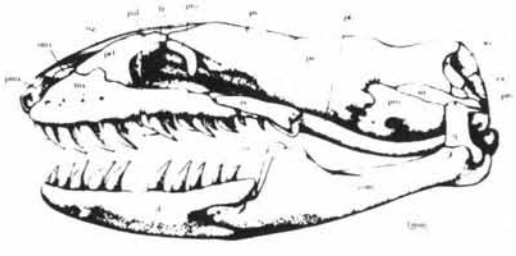


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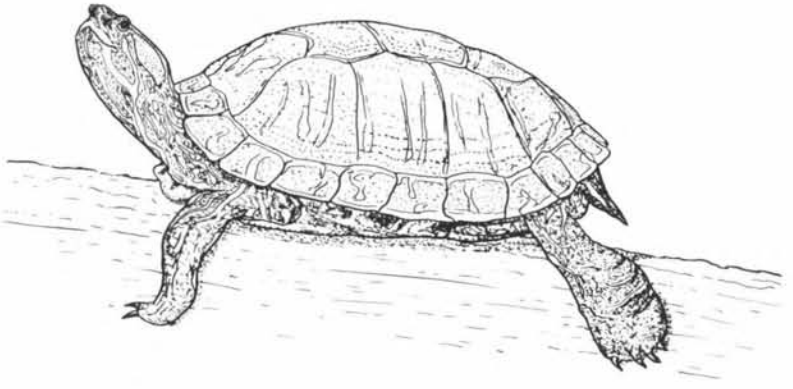
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CONSERVATION ADDENDUM

The U. S. Fish and Wildlife Service, Office of Endangered Species, Washington, D. C. 20240, is considering that the Pine Barrens treefrog (Hyla andersoni) be listed as an Endangered Species, and that the golden coqui (Eleutherodactylus jasperi) be listed as Threatened. Persons desiring to comment on these two proposals should write to the Director USFWS BEFORE 5 July 1977. Refer to bulletin FWS/OES/P35/(Eleutherodactylus) or . . . /P36/(Hyla). Information on locations of critical habitat are especially solicited.





An adult Phyllobates lugubris. Photographed by Harry Husberg.



An adult western bird-voiced treefrog (Hyla avivoca) from the Pine Hills of Union County, Illinois. Collected by Tom R. Johnson and Ronald A. Brandon on 8 June 1976. Photograph by Tom R. Johnson and Ronald A. Brandon.



A caiman in the Reptile House of the St. Louis Zoo. Photograph by Tom R. Johnson.



An adult Bufo americanus copei from Moosonee (James Bay) in Ontario, Canada. Photographed by Robert Hodge, University Museum, University of Alaska, College, Alaska 99701.

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The following statement-of-purpose appeared in the Introduction to the first issue of Herpetological Review in 1967 (Corson Hirschfeld, Editor):

> "Herpetological Review incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the Review will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to all persons in herpetology and we hope all members will find it informative and entertaining."

Now in its tenth year, Herpetological Review remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the Journal of Herpetology -- see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Authors are urged to write the editors before submitting feature-length articles. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles are desired. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

Reprints of contributions can be supplied if desired. Contributors will receive ordering information prior to publication of their material. Herpetological Review will accept commercial advertising. Rates and copy information are available from the editors.

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Membership is open to anyone interested in amphibians and reptiles. Members have voting privileges in the Society. They receive the Journal of Herpetology (four issues per year), Herpetological Review (four issues per year), Herpetological Circulars, and several Facsimile Reprints in Herpetology. Members may purchase other Society publications at reduced rates.

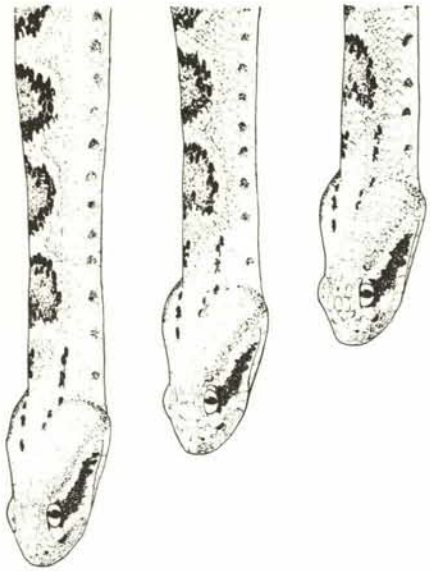
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Herpetological Review

Volume 8 March 1977 Number 1

Contents

SSAR-HL meeting in Lawrence, Kansas (1977) 2

Report on SSAR meeting held in Oxford, Ohio (1976) 3

Feature Articles:

Another yellow albino amphibian by Thomas Vance and Gerald Taplin . 4

An albino Ambystoma tigrinum mavortium from Kansas by Jeffrey Howard Black and Joseph T. Collins 5

Observations on the food of three forest-dwelling lizards in California by Imre S. Otvos 6

SSAR sustaining and contributing members 7

SSAR conservation fund contributors 7

In Memorium:

Bertha Lutz (1894-1976) by J. P. Kennedy 8

Isabelle Hunt Conant (1901-1976) by Edmund V. Malnate 9

Conservation:

Support Galapagos program 9

Madras Snake Park Trust 9

Office of Endangered Species report 9

Book Reviews:

Salt glands in birds and reptiles by Peaker and Linzell 10

The Palearctic desert lizards by Scherbak 11

Nepalese frogs: The subgenus in herpetological classification. A review of Les Grenouilles du Sous-genre Paa du Nepal. Famille Ranidae, Genre Rana by Dubois 11

Geographic Distribution 13

News Notes 14

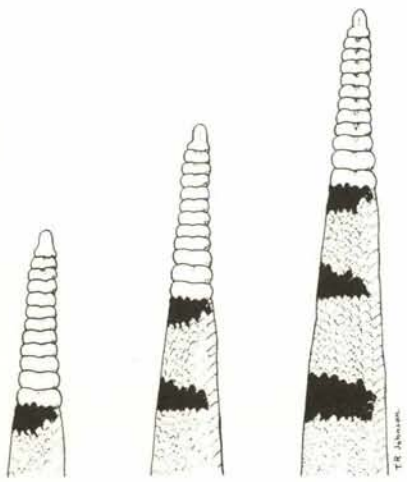
Errata 15

Current Literature 16

Advertisements 26

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JOINT ANNUAL MEETING

HERPETOLOGISTS' LEAGUE



SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

sponsored by
THE UNIVERSITY OF KANSAS
with the cooperation of
THE KANSAS HERPETOLOGICAL SOCIETY
in
LAWRENCE, KANSAS U.S.A.
7-13 AUGUST 1977

FEATURED SYMPOSIUM:

The South American Herpetofauna: Its Origin, Evolution and Dispersal

THE PROGRAM:

Sunday, 7 August.—	SSAR Board Meeting
Monday, 8 August.—	Registration — Herpetologists' League Executive Council Meeting — Regional Society Meetings
Tuesday, 9 August.—	Contributed Papers — Social (evening)
Wednesday, 10 August.—	Contributed Papers — Picnic (evening)
Thursday - Saturday, 11-13 August.—	Symposium: The South American Herpetofauna

GENERAL INFORMATION:

Pre-registration Forms, including the **Call for Papers** and general information about the meetings will be mailed to society members in March.

The **deadline** for **abstracts** is **Monday, May 2, 1977.**

The **deadline** for **pre-registration** is **Friday, July 15, 1977.**

Pre-registration Fee of **$12** is due no later than July 15, 1977.

Registration Fee on or after 8 August will be **$17.**

Dormitory Housing is available at the following rates:
$7.50 per day per person: double occupancy — $10.00 per day per person: single occupancy

Camping Facilities for tents and recreational vehicles are available at the Lawrence KOA.

Child Care Facilities and Activities will be arranged if there is sufficient need and interest.

Transportation: Individuals planning to travel by air should make reservations into Kansas City International Airport (KCI) and book space on Lawrence Aviation commuter flights between KCI and Lawrence. Transportation between the Lawrence airport and the city of Lawrence will be provided if the Local Committee is notified in advance of times of arrival and departure.

LOCAL COMMITTEE CHAIRMAN:

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Lawrence, Kansas 66045
(913) 864-3342

Annual Meeting News

SSAR 1976 ANNUAL MEETING (OXFORD, OHIO)

Jim Vial called the business meeting to order and noted that, in the absence of a quorum, the meeting must be considered informative rather than official. Vial proceeded to introduce the members of the Board and notified the membership that a by-law amendment had been approved last year that now provided for a total of six directors instead of the four previously. Vial read the list of candidates for the respective offices as follows--Chairman Elect: Joseph T. Collins, Gary Ferguson; Secretary: Stephen R. Edwards; Treasurer: Henri Seibert; Directors-at-Large, Directors 1 and 2 (1977-1980; representing regional societies, wildlife management and zoos): Stanley Dyrkacz, Michael C. Long, Tom Johnson, and James B. Murphy; Director 3 (1977; general SSAR membership): Roy McDiarmid, Norm Scott. Vial asked for additional nominations from the floor. In the absence of further nominations, Edwards moved (Adler seconded) to accept the slate as presented. The motion passed unanimously.

Henri Seibert reported that membership in the Society was increasing and that we had more members today than we did at the end of 1975. He requested the membership to provide suggestions for conservation projects to the Chairman of the Conservation Committee, Glenn Stewart. He noted that, pursuant to Board decision, in the future, claims for missing journals would not be honored after three months.

Max Nickerson presented the following resolution:

BE IT RESOLVED that the SSAR wishes to acknowledge Dr. Henri Seibert for his continued outstanding and unselfish efforts on behalf of the SSAR. His performance and dedication serve as a model for those who would strive for excellence on the behalf of the Society. SSAR offers its sincere thanks for a job more than well done.

The resolution was seconded by Kraig Adler and unanimously passed with a standing ovation for Dr. Seibert.

Vial announced the Student Prize for this year would be awarded to Bonnie Walters for her paper entitled "Studies of Interspecific Predation within an Amphibian Community," J. Herp. 9(3): 267-279.

Vial announced that future meetings would be held in 1977 at the University of Kansas, Museum of Natural History; 1978 at Arizona State University, Tempe (in late May or early June); and, in 1979 at the University of Tennessee, Knoxville.

Vial reported that he had charged the Secretary with securing corporate status for the SSAR and submitting application for membership in the Association of Systematics Collections.

Vial reported that the Journal of Herpetology would receive a one-third increase in its budget for 1977 designed to decrease a backlog of papers awaiting publication and that each issue would therefore be increased in size.

New co-editors had been selected for Herpetological Review effective January 1. The new editors will be Joseph T. Collins and George Pisani. He stated that Collins and Pisani had plans to increase the number of pages published next year by 60-80 pages; further, that the Current Titles section of Herpetological Review was now under the management of Dick Worthington.

Vial stated that fifteen accounts would be published in the Catalogue next year for a subscription price of $6.00.

Kraig Adler reported on the activities of the Facsimile Reprints program noting that McIlhenny's book would be distributed in September or October. Holbrook's volume on North American Herpetology will be available later this fall; 87 patron's copies had been sold. Costs for publishing the Holbrook volume had been met through pre-publication sales. Adler requested that anyone having ideas or suggestions for possible titles that could be published under the Facsimile Reprints program to contact him as soon as possible.

Harry Greene presented the following resolution:

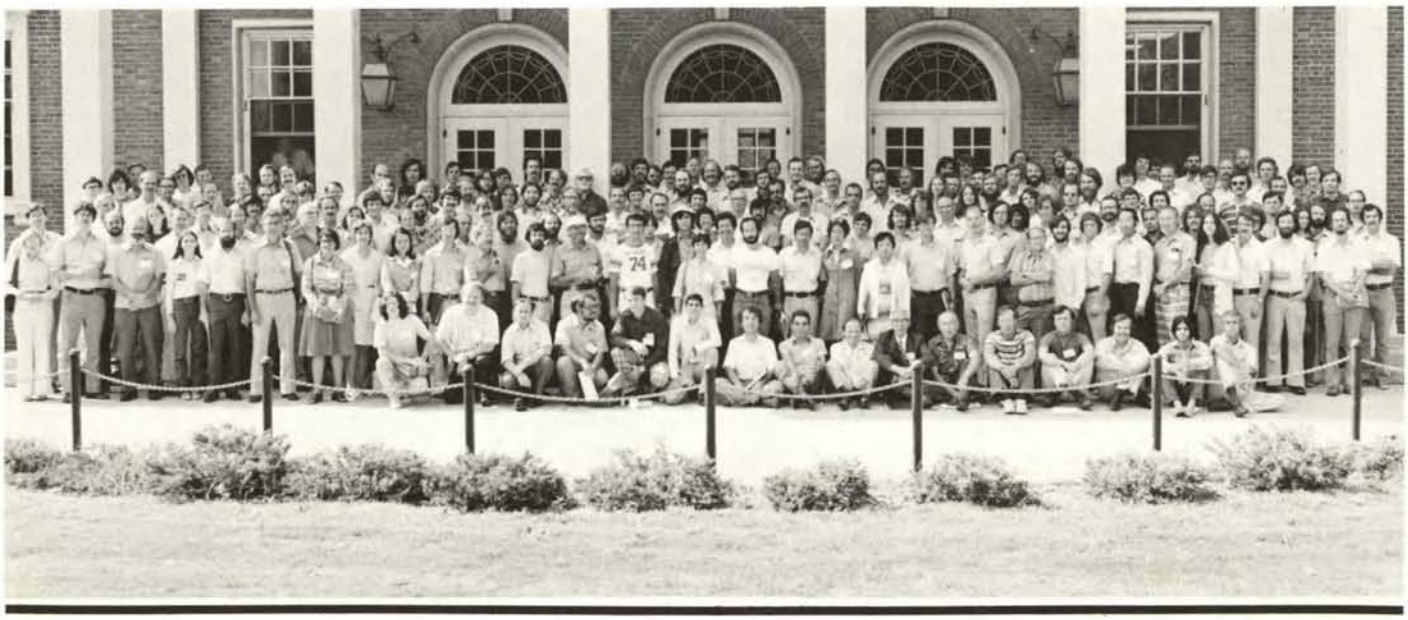
WHEREAS the eastern indigo snake (Drymarchon corais couperi) is a large predator on a variety of vertebrates and therefore of considerable ecological importance; and

WHEREAS the eastern indigo snake is presently found only in portions of the southeastern United States and as such is a relict of an environment that once dominated the coastal plain of North America; and

WHEREAS the eastern indigo snake has declined markedly in southern Georgia recently due to habitat destruction and commercial collecting; and

WHEREAS the legal protection of eastern indigo snakes in Florida is circumvented by alleging that snakes in the pet trade are collected in Georgia;

THEREFORE BE IT RESOLVED that the Society for the Study of Amphibians and Reptiles at its 1976 meeting in Oxford, Ohio expressed unanimous support for Howard Lawler's proposal



of endangered species status for the eastern indigo snake in Georgia; and

BE IT FURTHER RESOLVED that copies of this resolution be forwarded to appropriate authorities in the Department of Natural Resources of the State of Georgia.

Harry Greene moved (Huheey seconded) to accept the resolution as presented. The motion passed unanimously.

Greene presented a second resolution as follows:

WHEREAS the eastern diamondback rattlesnake (Crotalus adamanteus) is a large predator on small mammals and therefore probably of considerable ecological importance; and

WHEREAS rattlesnake populations may be especially vulnerable to disruption because of delayed maturity, small litter size, and biennial reproduction; and

WHEREAS the expressed purposes of these roundups are to promote tourism and control dangerous animals; and

WHEREAS each of these goals could more appropriately be achieved by other methods; and

WHEREAS rattlesnake roundups are often inhumane spectacles and contribute to an unfortunate public image of snakes; and

WHEREAS the use of gas in rattlesnake roundups has potentially lethal side effects on all plants and animals in the vicinity;

THEREFORE BE IT RESOLVED that the Society for the Study of Amphibians and Reptiles at its 1976 meeting in Oxford, Ohio condemns the general practice of rattlesnake roundups and specifically urges restrictions on the introduction of toxic substances into animal burrows during these events;

BE IT FURTHER RESOLVED that copies of this resolution be sent to appropriate state, federal, and private conservation agencies.

Greene moved (Gregory Mayer seconded) to accept the resolution as presented. The resolution passed unanimously.

Bob Mount presented the following resolution:

BE IT RESOLVED that the Conservation Committee be charged with: 1) determining the most appropriate course of action toward the end of amending the Pitman-Robertson Act to permit federal funds appropriated through the Act to be used for research on reptiles and amphibians; and 2) to inaugurate and pursue a program to accomplish that end.

Mount moved (the motion was seconded) to accept the resolution as presented. The motion passed unanimously.

The meeting was adjourned by Jim Vial.

Respectfully submitted,

STEPHEN R. EDWARDS
SSAR Secretary



SYMPOSIUM PARTICIPANTS (Reproductive Biology of Amphibians): 1st Row--Sheldon I. Guttman (Co-Editor Symposium Proceedings), Stephen Tilley, Midori Nishioka, Toshijiro Kawamura, Lynn Houck, Timothy Halliday. 2nd Row--Hans Blankenhorn, Kentwood Wells, Robert Capranica, Giorgio Mancino, Leszek Berger, Murray Littlejohn. 3rd Row: Hans Schneider, Thomas Uzzell, Max Nickerson, Stevan Arnold, Douglas H. Taylor (Co-Editor Symposium Proceedings).

ANOTHER YELLOW ALBINO AMPHIBIAN

This report concerns a yellow albino Fowler's Toad, Bufo woodhousei fowleri, that was captured in Hunt County, near Commerce, Texas during the early part of September, 1975, and which has been kept alive in a terrarium in the Biological Learning Center at East Texas State University.

The term "yellow albino" has been applied previously to a salamander, Desmognathus fuscus, by Channell and Valentine (1972). The color of their salamander is remarkably similar to the coloration of the Fowler's Toad in the East Texas collection.

Conant (1975: 310) describes the normal coloration of Fowler's Toad as follows: "A typical Fowler's Toad has: (a) 3 or more warts in each of the largest dark spots; (b) a virtually unspotted chest and belly... Many speciemns have a single dark breast spot on an otherwise immaculate venter. The general dorsal coloration is brown or gray or, more rarely, greenish or brick-red. A light middorsal stripe."

Max Hensley (1959: 138) reports the capture of a "particularly albinistic female," two undescribed specimens and a "light mutant" of this species. In the specimen from east Texas the pupil is black and the iris is antique gold, with a slight veinous pattern which appears chocolate brown. Head markings are absent. The cranial crests are a gray-bone white. The paratoid glands are pitted and a slightly darker shade of bone white than the cranial crests. This is partly due to a shadow effect caused by the pits. The coloration of the anterior 2/3 of the back region is a slightly lighter tint than the head. A dorsolateral blotch, ochre in color, is present in front of the femoral area. The dorsum is unicolor, without markings such as spots, or a vertebral stripe. A dorsal crease, which is difficult to see in normal specimens, is very evident. This crease extends from the posterior portion of the head to the anal region. The upper portion of the thighs are greenish-yellow. The rest of the leg is the same as the dorsum. The soles of the front feet are a reddish-purple. The tips of the toes are a light salmon color. A moss green coloration is apparent in grooves between the tubercles on the lower leg portions and the dorsum of the hind feet. The soles of the hind feet are bluish-gray, apparently the color of subcutaneous tissue as seen through the translucent integument. Tips of the toes are sienna and bordered by pink. The throat is yellowish-beige and unmarked. The chest and upper regions of the belly are a lighter shade than on the back

while the lower abdominal area exhibits a capillary network which is cadmium red.

The specimen has been maintained in a 18" x 10" terrarium. It has grown very fat on a diet of mealworms (Tenebrio sp.), crickets and June Bugs. During nearly eight months of confinement, the toad's coloration has remained unchanged. It lacks the ability of changing to lighter or darker phases. It seems to follow the typical secretive behavior of toads. Judging from the speed and efficiency of its predatory behavior, the toad has relatively good vision, especially in partial darkness. This is in contrast to data reported for an albino Eumeces fasciatus (Brungs and Britt: 369).

ACKNOWLEDGMENTS

The authors would like to express their gratitude to Dr. Donald Ingold for proofreading the manuscript, to Deborah Malzac of East Texas State University who assisted with color identifications, and to Aletha Vance for typing the final manuscript.

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THOMAS VANCE and GERALD TAPLIN, Department of Biology, East Texas State University, Commerce, Texas.





AN ALBINO AMBYSTOMA TIGRINUM MAVORTIUM FROM KANSAS

Albino Ambystoma tigrinum have frequently been reported in the literature (Hensley, 1959; Brame, 1963; Bobrowsky, 1965; Gilboa and Dowling, 1974), but albinos of the subspecies A.t. mavortium apparently are uncommon.

Bragg (1955) and Black (1969) have reported white larvae of the Barred Tiger Salamander in western Oklahoma, but this coloration was apparently due to the physical and chemical conditions in the environment.

An albino Barred Tiger Salamander was obtained from Alan L. Maughan, a student at Oklahoma Baptist University, who obtained it from his grandfather, W.V. Heimey, of Miniola, Clark Co., Kansas. A Miniola water meter reader found the albino salamander in a meter box in November, 1974. Mr. Heimey uses the tiger salamanders for fishing bait; this was the second albino salamander obtained in this manner within the past three years.

The albino salamander (Figure 1), apparently a female, has pink eyes. Its yellow barred markings are in sharp contrast to the ground color. The skin is translucent giving a ground color of light gray beige with an overall rosy cast. The rosy cast is more evident in the costal grooves. The ground color is progressively lighter towards and onto the tail where it is grayish white. The belly skin is also translucent with darker viscera and parts of the circulatory system visible.

Following the methods of measurement in Peters (1964), the female has the following live measurements: Total length, 181.0 mm; Total length 1: 76.0; Head-body length 1: 105.0 mm; Axilla-groin length, 53.0 mm; Head length, 25.0 mm.

The salamander is on exhibit at the Oklahoma City Zoo.

LITERATURE CITED

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JEFFREY HOWARD BLACK, Department of Biology, Oklahoma Baptist University, Shawnee, Oklahoma 74801 and J. Willis Stovall Museum of Science and History, University of Oklahoma, Norman, Oklahoma 73069, and JOSEPH T. COLLINS, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045.



Figure 1. An albino barred tiger salamander (Ambystoma tigrinum mavortium) collected November 1974 by W.V. Heimey at Miniola, Clark County, Kansas.

OBSERVATIONS ON THE FOOD OF THREE FOREST-DWELLING LIZARDS IN CALIFORNIA

Few observations have been reported on the arboreal habits of lizards in western North America (Cunningham, 1955) and little is known about the diet of temperate forest-dwelling lizards (Johnson, 1965; Stebbins, 1966). An exception is the work of Toliver and Jennings (1975) who have studied the predatory role of Sceloporus undulatus tristichus Cope on a tip moth which attacks ponderosa pine (Pinus ponderosa Lawson). Data reported here are part of a study of the vertebrate predators of the western pine beetle, Dendroctonus brevicomis Le Conte, in California. Information presented adds to the scant knowledge on food habits of forest lizards.

The study was conducted at three locations in California: Blodgett Research Forest, Challenge, and McCloud Flat. The Blodgett Research Forest is located 16 km northwest of Georgetown, El Dorado County, at an elevation of between 1,250 and 1,310 m. The forest is a mixed conifer type, predominantly second growth stand of ponderosa pine (Pinus ponderosa Lawson), white fir (Abies concolor [Gordon and Glendenning] Lindley), and incense cedar (Libocedrus decurrens Torrey). Although considerable scattered old growth pine and fir remains, most of the trees are between 50 and 80 years old. At Challenge, Yuba County, the elevation varies from 760 to 910 m with the scattered ponderosa pine stand varying in age between 25 and 200 years. McCloud Flat, in the Shasta Trinity Forest, Siskiyou County, is located at an elevation of 1,160 m and the forest is a 100-year-old ponderosa pine stand intermixed with a few incense cedar. Five northern alligator lizards (Gerrhonotus coeruleus Wiegmann), three sagebrush lizards (Sceloporus graciosus Baird and Girard) and one western fence lizard (S. occidentalis Baird and Girard) were collected during July and August 1966 and 1967 at Gaddis Creek in Blodgett Research Forest. One northern alligator lizard and one western fence lizard were collected, at each of two locations (McCloud Flat and Challenge). The stomach of each lizard was removed, immediately after collection, and stored in 70% ethanol along with the carcass until examination.

Stomach contents were spread out uniformly to about 1 mm thickness in a petri dish with a millimeter grid underneath. Identification of the contents to taxonomic category proceeded as far as the stage of digestion permitted. Food particles were counted and the percent volume of each taxon was estimated from the area occupied by each taxon in relation to the entire stomach contents.

The stomach analysis is summarized below.

Although all three species of lizards are known to climb over wood piles and tree trunks (Stebbins, 1954; 1966), I seldom observed them on standing trees. Lizards were usually not more than 0.5 m from the ground and were neither on the trees under attack nor on those from which bark beetles were emerging. Of the two genera, Gerrhonotus was seen less frequently on standing trees than Sceloporus.

I wish to express my gratitude to Dr. R.W. Stark, University of Idaho, formerly University of California, Berkeley, for his encouragement during the study, and Dr. R.C. Stebbins, University of California, Berkeley, for the identification of the lizards. The investigations were supported in part by grants from the National Science Foundation (G-21004), T. B. Walker and Surdna Foundations, and the Canadian National Research Council through its Graduate Fellowship program.

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Food item	G. coeruleus		S. graciosus		S. occidentalis	
	No. of items	Est. % of total vol.	No. of items	Est. % of total vol.	No. of items	Est. % of total vol.
ARANEAE	5	4.9	1	2.5	1	8.0
COLEOPTERA	-	49.1	-	18.1	-	12.0
Buprestidae	1	3.0	-	-	-	-
Buprestis aurulenta	1	3.0	-	-	-	-
Carabidae	1	0.3	1	0.6	1	2.0
Chrysomelidae	3	1.6	-	-	-	-
Curculionidae	22	16.3	-	-	-	-
Elateridae	8	14.0	1	5.0	-	-
Histeridae	2	0.1	-	-	-	-
Ostomidae	6	3.0	-	-	-	-
Scolytidae	14	4.7	-	-	-	-
Dendroctonus valens	5	3.4	-	-	-	-
D. brevicomis	8	1.1	-	-	-	-
Gnathotricus retusus	1	0.2	-	-	-	-
Tenebrionidae	1	tr.[a]				
unidentified beetles	-	6.1	-	12.5	-	10.0
DERMAPTERA	1	0.9	-	-	-	-
DIPTERA	-	3.0	-	-	-	-
Syrphidae	1	3.0	-	-	-	-
Xylota sp.	1	3.0	-	-	-	-
HEMIPTERA	9	18.0	-	-	-	-
HYMENOPTERA	-	1.0	-	68.5	-	-
Formicidae	-	-	25	67.0	-	-
Camponotus sp.	-	-	4	44.0	-	-
unidentified ants	-	-	21	23.0	-	-
unidentified parasite	1	tr.	1	1.5	-	-
Siricidae	1	1.0	-	-	-	-
LEPIDOPTERA	5	2.3	1	9.0	4	80.0
ORTHOPTERA	-	14.5	-	-	-	-
Acrididae	3	6.0	-	-	-	-
Tettigoniidae	1	8.5	-	-	-	-
Anabrus simplex	1	8.5	-	-	-	-
unidentified insect parts	-	-	-	0.5	-	-
Plant material	-	6.2	-	1.4	-	-

[a] tr. = trace

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Effective immediately, Douglas H. Taylor (Department of Zoology, Miami University, Oxford, Ohio 45056) assumes the position of SSAR Publications Secretary. All requests and orders for SSAR publications and back issues should be sent to Dr. Taylor. Do not send them to Henri Seibert, SSAR Treasurer, or your order may be delayed for some time.

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We want to remind our members that the Journal of Herpetology, Herpetological Review, and the Catalogue of American Amphibians and Reptiles are mailed as Bulk Rate material and as such, can not be forwarded. That is, leaving a forwarding address at the Post Office or at the last place of your residence will not enable these publications to be sent on. It was decided by the Board of Directors at the last Annual Meeting that the SSAR, as of January 1, will no longer replace free of charge copies lost because of address changes unless notification of such change is received prior to the issuance of mailing labels to our distributors. It is therefore imperative that you provide us with your new address immediately. It is only with your cooperation that we can hope to maintain our dues structure as low as possible.

Henri C. Seibert
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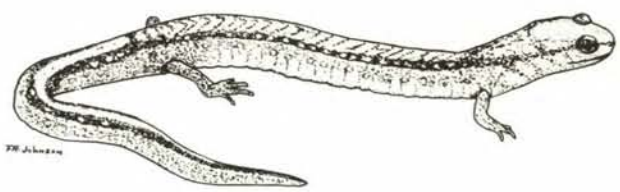
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In Memoriam

BERTHA LUTZ
NATURALIST-FEMINIST (1894-1976)

The distinguished Brazilian naturalist-feminist, Bertha Lutz, died in Rio de Janeiro on 16 September 1976. She was one of two children born to Dr. Aldolpho Lutz and Amy Chesshyre Fowler. Her coffin was borne entirely by women to the family tomb in Rio de Janeiro, where her parents and brother are buried. She was a life-long advocate of women's rights. Her rich family heritage prepared her well to pursue a diversity of interests.

The Lutz family is surely among the most distinguished in the annals of the Brazilian nation. Her father was of Swiss parentage. The Lutz family name has been on the register of the Burger of Bern, Switzerland, since 1559. Dr. Adolpho Lutz was born in Rio de Janeiro. He was a physician naturalist who made such significant contributions to the study of tropical medicine, natural history and government service that in 1955 the Brazilian government commemorated the centennial of his birth. His effigy has appeared on Brazilian postal stamps; several streets have been named after him. He married Amy Chesshyre Fowler in Honolulu. Dr. A. Lutz was conducting research on leprosy and had gone to Hawaii to pursue that interest. Amy Fowler, an Englishwoman, was a follower of Florence Nightingale. She had gone to Hawaii as a volunteer nurse to the lepers. Later she established the first free school in Brazil for neglected boys. She and Dr. Lutz returned to Brazil in 1893 after spending several months in San Francisco.

Bertha Lutz was born in Sao Paulo on 2 August 1894. She attended the secondary school in Sao Paulo, the Sorbonne, University of Paris and studied law at the Federal University of Rio de Janeiro.

Two major aspects of her life may be briefly recounted. First, she was a highly respected naturalist who published on a wide range of subjects. Her primary research was the study of frogs, but she authored papers on botany and general natural history, such as "Wild Life in Brazil" which appeared in Natural History in 1932. Her studies of frogs are usually indicative of her emphasis on field and laboratory observation. For many years she maintained a small live collection of frogs. Among her well illustrated field observations are accounts of the fighting behavior of Hyla faber (1960, Copeia, 61-63) and the nest building of Hyla pardalis (1960, Copeia, 364-366). Many of her publications are illustrated with photographs by her brother Professor Gualter A. Lutz. She was greatly interested in anuran life histories, behavior and ontogenetic development. "Trends Towards Non-Aquatic and Direct Development in Frogs" (1947, Copeia, 242-252) and the recent "Geographical and Ecological Notes on Cisandine to Platine Frogs" (1972, Journal of Herpetology 6: 83-100) are two of her memorable attempts at synthesis.

She described several new taxa and often provided descriptions of little known forms of Brazilian frogs. Her book Brazilian Species of Hyla, published in 1973, was to be the first of several books presenting observations on Brazilian frogs that she had gathered over several decades of work in the field and in the laboratory. The study of frogs began as a family effort under the direction of her father. She became interested in frogs at a young age when she accompanied her father on collecting trips. Fortunately, for herpetology, it proved to be a life long interest.



Bertha Lutz (1894-1976)

Second, but no less distinguished than her scientific career, are her considerable achievements as a feminist. As a teenager she became interested in women's suffrage and later took a law degree to prepare her for the legal advancement of women's rights. She authored papers on legal topics. Interestingly, she discovered no antifeminism statutes in Brazil. It was simply that women had not voted or held government positions in Brazil because no leader had ever told them they could. Working with a small group of women in 1922, she helped to organize the first women's rights association in Brazil--the Federacao Brasileira pelo Progresso Feminino. This organization was largely responsible for securing equal suffrage in 1933 and has subsequently achieved much in the women's movement. It is active today. In 1932, Bertha Lutz was on the committee charged to draft a new constitution for Brazil. Her efforts were evident when in 1934 Brazil included a women's rights provision in its new constitution. With the aid of government officials she introduced and passed bills to insure women's rights in the labor movement. She was repeatedly appointed and elected to important positions from which she expressed the need for equal rights for women. She often was the official representative of the Brazilian government at international conferences. She represented Brazil at the International Conference of Women in Rome (1923); Berlin (1929); and at the Pan-American Conference of Women in Baltimore (1922); Washington (1925). She was a delegate to the 7th Pan-American Conference, Montevideo (1933); a member of the Committee on labor conditions of women of the International Bureau of the League of Nations. She was a delegate to the United Nations Conference in San Francisco in 1945. In 1974, she was Brazil's representative on the Inter-American Commission for Women, Organization of American States, which convened in Washington, D.C. Her career in government service and science was often complementary. In fact, her successful competition for the position of secretary of the National Museum in Rio de Janeiro was an achievement for women by which she became the second woman to hold an important post in government service. In 1931 she became head of the department of natural history and geology and acting head of the department of botany of the National Museum. Her contributions to agriculture earned her decorations from the Belgian (1924) and German (1931) governments.

She lived in a large house in Rio de Janeiro on the Avenida Edison Passos, until shortly before her death. She also maintained a small rural cottage in Teresopolis. Localities near the latter are sometimes referred to in her publications as sites of some of her field observations. She was fond of dogs and kept four of them as pets. One day, during her visit to my home in Houston, we went to the Big Thicket. It was an active and energetic day but she thoroughly enjoyed it. She was 80 years of age at that time.

The Bertha Lutz (Fig. 1) that I knew was a highly cultured and gentle woman. Those who value human rights and the lives of frogs have little more for their pleasure because of her.

J. P. KENNEDY, Graduate School of Biomedical Sciences, University of Texas, Houston, Texas 77025.

ISABELLE HUNT CONANT (1901-1976)

Most, if not all, of those persons who have an interest in the amphibians and reptiles of the United States are aware of Isabelle Hunt Conant as the creator of the many excellent illustrations in Roger Conant's Field Guide to the Reptiles and Amphibians of Eastern and Central North America. Her skill as a photographer and artist is evident even in a casual riffling through the book.

Less evident, to those who did not know Isabelle and without some thought, is the tremendous amount of work involved in the production of these illustrations. Behind the many hours of painstaking photography, print-making and hand-coloring was the obsessive desire of a master craftswoman to achieve the best possible results from her talents. This kind of dedication and self-discipline were characteristics of Isabelle that, at those times of frustration periodic to all artists, may have been severely tested but never were defeated.

Taking the easy way out was not Isabelle's style...to always strive for the best, was. Her success as an animal photographer at both the Staten Island and Philadelphia Zoos led to continuous requests for her photographs from around the world; and even from local press photographers who sought her assistance in fulfilling an assignment. Beyond this professional recognition Isabelle contributed innumerable illustrations of amphibians and reptiles to scientists for use in the technical publications reporting upon their studies. No piece of work carrying her credit line was ever less than Isabelle's best effort.

Isabelle Hunt Conant was the loyal supporter of her husband, Dr. Roger Conant, through his tenure as Public Relations Director and as Director of the Philadelphia Zoological Garden; indeed, in all his activities. She was his constant companion and aide on a long series of field trips that took them throughout Mexico, where camping-out was the only way to ensure a successful collecting trip. Isabelle and Roger Conant attended many herpetological and zoo conventions throughout the United States, in Europe and in Africa. Her camera, on all trips, always was in ready reach and many beautiful and exciting photographs were the expected result.

The extensive files of negatives and slides accumulated during her professional career might indicate that Isabelle was all work. Not so. She enjoyed social contacts with groups large and small and her company, in turn, always was enjoyable. Isabelle's excitement about her activities, whether achieving a handsome photograph, enjoying an evening of jazz, Dixieland style, or preparing jars of tasty (a personal recipe) cranberry preserves to enhance the Christmas dinners of friends, will be remembered fondly and warmly by many. All who knew Isabelle, in herpetological and zoo circles here and abroad, admired her work and both enjoyed and benefited by her friendship. Isabelle Hunt Conant was a fine craftswoman and a good and loyal friend.

EDMUND V. MALNATE, Academy of Natural Sciences, Philadelphia, Pennsylvania 19103.



This photograph of two baby caimen was taken by Isabelle Hunt Conant on 29 March 1947 at the Philadelphia Zoo. It took first prize in the Nature Division competition of the Photographic Society of America, and was one of Isabelle Conant's favorite photographs.

Conservation

SUPPORT GALAPAGOS PROGRAM

In 1959, just one hundred years after the appearance of Darwin's famous work, the Charles Darwin Foundation for the Galapagos Isles was founded under the auspices of UNESCO and the IUCN as an international organization devoted to the conservation and study of the natural history of the Galapagos. The Darwin Foundation was entrusted by the Government with the establishment of a permanent field station in the Islands which was officially inaugurated in 1964 and has continued to grow in size and responsibility.

During the first years (1960 - 1964), work was mainly concentrated on surveys of endangered species and establishing the research station. Basic data were obtained to design conservation projects, and many scientific missions, financed by their home institutes or countries, began coming to the station. The second period (1965-1968) commenced with more specific conservation measures, (e.g. rearing of tortoises), and educational programs (e.g. natural history courses for Galapagos teachers). The third period (1968-1976) has shown a substantial increase in practical conservation measures (tortoise rearing programs, control and extermination of introduced animals, tourist management programs), environmental education projects, research on endangered species and habitats, and the establishment and rapid growth of the Galapagos National Park Service.

Native plants, animals and habitats continue to be severely threatened on almost all of the islands by introduced predators and competitors (pigs, dogs, cats, black rats, goats, donkeys, cattle), many exotic plants, and several invertebrates (including a fireant). More tourists have visited the Galapagos in the 1970's than in all previous decades. These concentrations of visitors in the most beautiful and representative sites in the Islands must be controlled carefully and their impact studied for future planning.

The nontourist population of the Galapagos has nearly tripled since 1960 and now numbers approximately 4,000.

Increased deployment of Ecuadorian wardens and patrol boats, expansion of the educational programs, and an increase in applied research on introduced animals and plants and tourist impact are needed. The normal scientific work of the Station must be continued along with the vital conservation programs.

All this requires money.

Over 90% of the income must come from personal donations to the Foundation or to the World Wildlife Fund, the Frankfurt Zoologische Gesellschaft or similar supporters. Since to such a large extent the income depends on irregular sources, a gift is so important.

Contributions to the Foundation are tax deductible in certain countries, and will be very gratefully received at the Darwin Station or through the offices of the Foundation listed below. All contributions receive Noticias de Galapagos, our journal carrying articles on Galapagos science and conservation as well as news from the Darwin Station about current events in the Islands.

Secretary-General
Charles Darwin Foundation
Palais de Academies
1, rue Ducale
Brussels 1, BELGIUM

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Please note that tax deductions for U.S. citizens are permitted only on gifts to non-profit U.S. institutions. U.S. contributors can make checks payable to the Smithsonian Institution "for conservation and science in the Galapagos Islands" and send them to the Foundation's Secretary for the Americas (see above address), or similarly may make tax - deductible donations through the World Wildlife Fund.

NEWSLETTER OF THE MADRAS SNAKE PARK TRUST

The Madras Snake Park and Conservation Centre of Madras, India, has recently issued the first issue of their newsletter to be issued at an irregular basis, three or four times a year.

Mrs. Zahida Whitaker edits this interesting publication intended to create and further interest in Indian Reptiles and Amphibians.

The Madras Snake Park was initiated and founded by Romulus Whitaker (Honorary Director) in 1969 with financial help from World Wildlife Fund. The Park is a private organization and is self supporting on an entrance charge of 25 paise. About 500 snakes are housed in open "pits" and terrariums. Apart from being a public education center, the Park undertakes and encourages research on Indian herpetofauna. Over half a million people visit the Park each year.

In 1975, a crocodile breeding project, the Madras Crocodile Bank, was started for the breeding and Indian Crocodilians (Crocodylus palustris, Crocodylus porusus, and Gavialis gangeticus) all of which have shown an alarming decline in number due to poaching, habitat destruction, etc. The World Wildlife Fund has donated Rs. 10,000 to this project. Due to paucity of funds, opening of the Crocodile Bank has been delayed.

If you are interested in helping this project and receiving their Newsletter, write to:

Mrs. Zahida Whitaker, Editor Newsletter, Madras Snake Park, Guindy Deer Park, Madras 600022, India.

Enclose a small donation to help them defray cost of printing and mailing this overseas. This is the type of conservation project that actually is doing something concrete about preserving the endangered wildlife in a critical situation. Rom is a sincere young man and has been working hard with little recognition for several years to save and preserve the herpetofauna of India.

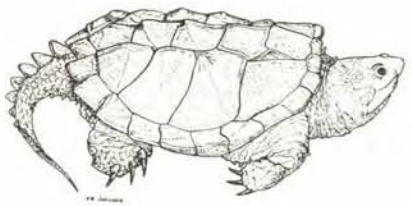
PROPOSED ENDANGERED SPECIES

The USDI Office of Endangered Species (Washington, D.C. 20240) has information on file that the giant anole, Anolis roosevelti, and the St. Croix ground lizard, Ameiva poloops, should be determined to be Endangered. On January 10, 1977, they published in the Federal Register (42 FR 2101-2102 and 2102-2104) their proposal to make such a determination.

Information you might provide would be helpful in this decision and they would particularly appreciate you: 1) providing any factual data you may have access to concerning the status of this species; 2) informing them of any special considerations that should be taken into account prior to their final determination of the lizard's status; 3) providing them with additional habitat areas which may be critical to the species; or 4) providing any other information you feel relevant.

The Office of Endangered Species is proposing to determine Critical Habitat (pursuant to Section 7 of the Endangered Species Act) for the species at this time, and are soliciting information concerning the location of additional areas which should be designated as Critical Habitat for the giant anole. Such habitat information is particularly desirable. Reply with reference to FWS/OES/P33 (Ameiva) and/or FWS/OES/P37 (Anolis).





Book Reviews

SALT GLANDS IN BIRDS AND REPTILES (Monographs of the Physiological Society 32) by M. Peaker and J. L. Linzell. Cambridge University Press, New York and London. x + 307 pp., illus. $27.50.

The function of salt glands was first described for birds in 1957 and for marine reptiles the following year. Since then research on these glands has progressed until our knowledge can fill this 300-page monograph. Its first 227 pages are devoted to the anatomy and physiology of avian salt glands whereas only 38 pages are devoted to the reptilian glands.

Although the reptilian section is much the shorter (a reflection of research interests? or difficulty of subjects?) it is potentially the more interesting as reptiles possess a variety of salt secreting glands, none of which is homologous to its avian counterpart. Marine turtles and Malaclemys have orbital (lachrymal) glands that secrete sodium ions, sea snakes have oral (sublingual) glands, and lizards have nasal glands that secrete potassium, in the terrestrial species, as well as sodium. Salt water crocodiles have (lachrymal?) glands but no gland has yet been detected in the tuatara. Although the phylogeny and evolutionary implications of the glands are discussed in the terminal chapter, it is obvious that the reptiles need more intensive research to answer a host of questions dealing with origin, adaptiveness, as well as basic physiology.

In true monographic spirit, the book has an extensive bibliography with an addendum of more recent work, an author and subject index, plus useful figures, plates and tables. It is also most readable.

Henri C. Seibert
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THE PALEARCTIC DESERT LIZARDS by Dr. N. N. Scherbak. 296 pp., 92 photos. Published by The Academy of Sciences Ukrainien SSR Institute of Zoology, Kiev, USSR. 1974.

This book by Nicolay Scherbak (Curator of Kiev Zoological Museum) is his doctoral dissertation work on Asiatic lizards of the genus Eremias. The revision covers 22 species and 36 subspecies previously assigned to this genus and is the result of 5 years of research in the field and laboratory using or observing approximately 5000 lizards from the author's personal collection, the collections of European Museums, and from collections in the USA (California). These desert lizards are particularly distributed in the USSR (Asiatic area), Central Asia, and Mongolia, and are difficult to identify and differentiate due to extensive variation. On the basis of studying many populations and a thorough knowledge of literature about the genus, the author writes that constructing an absolutely reliable identification table of the genus Eremias is practically impossible. The author's system of identification has a 95% reliability in identifying these variable lizards. Scherbak's definition of the Asiatic group now includes 26 species and 5 subgenera: Eremias, Pareremias, Omnateremias, Rhabderemias, and Scapteira. Eremias strauchi, E. persica, E. regeli and some other forms are described as species, not subspecies as is the opinion of some herpetologists (R. Mertens, S. Minton, and others). According to the author's experience, the identification of species of Eremias by histological methods is difficult. The species Eremias guttulata (according to Scherbak) is a member of the African desert lizard genus Mesalina containing the following species: Mesalina guttulata, M. olivieri, M. brevirostris, M. adramitana, M. rubropunctata, M. pasteuri, M. breviceps, M. managuensis, M. undata, M. benguelensis, M. laticeps, M. furschelli, and M. lineo-occellata. Ecological observations are most detailed about feeding (including feeding tables), observed activity by author (about 12 species of 22 populations), behavior in captivity, temperature regime from observations in the field and laboratory on 13 specimens, and geographic variability. Each species description contains photos of typical specimens, synonymys, and a literature list. The author includes his original research on Mongolian desert lizards, especially information on livebearing, feeding, and activity in E. przewalskii. This book is especially interesting and useful to zoologists, herpetologists, and museum curators, as systematic monograph about Asiatic desert lizards of the genus Eremias.

George Mamonov
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U.S.S.R.

EDITOR'S NOTE: Mr. Mamonov is willing to exchange books and reprints (including the title reviewed above) written by Russian herpetologists in order to obtain an SSAR membership in his name. Anyone interested in such an exchange should make arrangements with Mr. Mamonov and the SSAR Treasurer (see inside cover for address).

NEPALESE FROGS: THE SUBGENUS IN HERPETOLOGICAL CLASSIFICATION. Les Grenouilles du Sous-genre Paa du Nepal. Famille Ranidae, Genre Rana, by Alain Dubois. Cahiers Nepalais--Documents No. 6. vi + 275 pp., 1976. ISBN 2.222.01940.0. Centre National de la Recherche Scientifique, 15 quai Anatole - France 75700 Paris. Price 25 French Francs.

This paper-bound publication offset from typescript on pages trimmed to 20.5 X 29.5 cm is Dubois' doctoral disseration, completed under the direction of Prof. Maxime Lamotte at l'Ecole Normal Superieure in Paris. The subject of the book is the "Rana liebigii group," which was recognized as the subgenus Paa by Dubois (1975).

The introductory material (21 pages) contains a geographical and phytogeographic review of Nepal and a geographic analysis of the amphibians of this Himalayan country. Dubois records one species of salamander and 37 species of frogs in the Nepalese herpetofauna; 21 of these species are members of the genus Rana (sensu lato). Much of the material was collected by Dubois between 1970 and 1973. The following section of eight pages is devoted to the definition of the subgenus Paa and the justification of the recognition of 19 species as a subgenus.

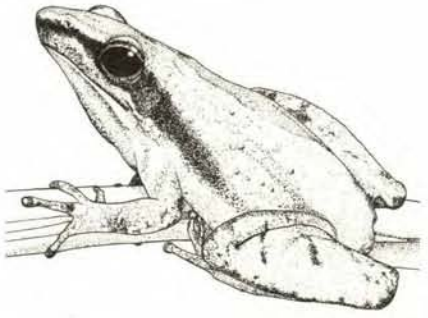
In sections on the Paa of Nepal, the first 11 pages are devoted to the materials and methods of study. The bulk of the book (168 pages) contains the eight species of Paa known from Nepal. Each of the species accounts contains detailed descriptions of adults and larvae and discussions of sexual dimorphism, reproduction, behavior, ecology, distribution, and in some species ethnozoology. A concluding section of 28 pages contains various univariate statistical analyses of the Nepalese species of Paa and "phyletic" arrangements, which are cluster diagrams based solely on phenetics.

Appendices contain 38 tables, a list of localities, and a list of specimens examined. The text contains 59 tables and 92 figures--maps, graphs, and line drawings of frogs.

Dubois' work is a seemingly thorough and comprehensive review of a formerly poorly known group of frogs in a region that until recent years has been unknown to the biologist. Dubois' systematic approach offers nothing novel; in fact, his phenetic approach leaves him open for criticism. The most noteworthy aspect of Dubois' monograph is his formal recognition of a group of species as a subgenus.

Subgenera have been used sparingly in herpetology, although their use is more frequent and accepted in mammalogy and ichthyology. The appearance of a monograph dealing with a subgenus of frogs is bound to evoke responses varying from enthusiastic support to outright rejection. A negative response is expected from most herpetologists who deal with North American amphibians and reptiles, for literature on the North American herpetofauna is almost devoid of the subgenus. In recent years only the sporadic use of the subgenera Spea and Scaphiopus occurs in the literature.

Systematists have been struggling for decades with the problem of imposing a static classification on a dynamic evolutionary system. Recent attempts at improving the objectivity of the reconstruction of phylogenies (Hennig, 1966), have raised new problems in classification. The definition of branching sequences and sister groups on the basis of shared derived characters frequently results in cladograms at variance with present classification and the necessity of resurrecting old, or coining new, names for separate clades. Heyer and Liem's (1976) analysis of myobatrachid frogs necessitated the recognition of additional genera and subfamilies. Refinements of phylogenies and efforts to have classifications reflect the phylogenies of the organisms have resulted in greater use of optional heirarchical categories, such as subfamilies and tribes. These categories have been used effectively in plethodontid salamanders (Wake, 1966) and leptodactylid frogs (Lynch, 1971).



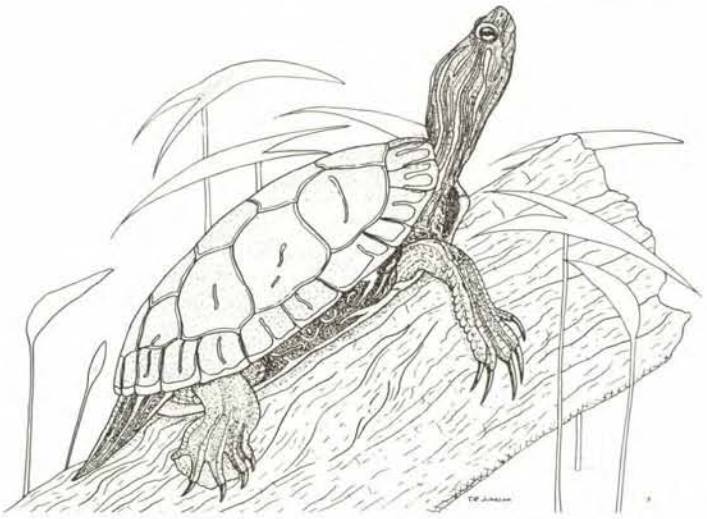
The generic category, although ideally reflecting a natural grouping of species on the basis of morphology, ecology, and geography (Inger, 1954), too often is a category of convenience. Very large genera are burdensome and to some systematists completely unpalatable. Rana with about 280 species, Hyla with about 300 species, and Eleutherodactylus with about 340 species are among the largest anuran genera, whereas Anolis is a notoriously large reptilian genus. Etheridge (1960) treated the two major groups of Anolis as the alpha and beta sections of the genus; these informal groups have become so well entrenched in the herpetological literature that Savage's (1973) resurrection of the generic name Norops for one of the groups has been ignored in favor of the accepted group designations. The recognition of infrageneric groupings as species groups is a common practice (Zweifel, 1959; Duellman, 1970; Wake and Lynch, 1976). In treating the immense genus Eleutherodactylus, Lynch (1976) recognized numerically designed infrageneric units, each containing species groups.

The use of subgenera presents problems not encountered with other optional heirarchical categories. The principal problem is nomenclatural, because a name whether proposed or used as a generic or subgeneric name is a genus group name under the International Rules of Zoological Nomenclature and is subject to all of the applicable rules. Thus, using one of Dubois' group as an example, all three of the following combinations are nomenclaturally correct:

1. Rana liebigii
2. Rana (Paa) liebigii
3. Paa liebigii

The subgeneric name Paa will be used knowingly or unwittingly as a full generic name within the next few years. Presumably if the author of that combination does so knowingly, it is indicative of the elevation of Paa to a classificatory and evolutionary rank equal to Rana. At the present time there is lack of uniformity of usage of genus group names in Old World ranids. For example, Dubois (1976:12) recognizes Dicroglossus, Hylarana, and Tomopterna as subgenera of Rana, but these are accorded full generic rank by Laurent (1964) and Perrett (1966).

Vacillation in the level of usage of genus group names creates problems for the systematist and nightmares for the non-systematist. Persons compiling distributional checklists or files for environmental impact statements working from the literature will not associate Rana liebigii and Paa liebigii, although they might make the association if the combination Rana (Paa) liebigii also were included. Computer compilation most likely would result in the recognition of three taxa. Such nomenclatural confusion detracts from the credibility of taxonomy.



These problems can be eliminated by the use of informal terms instead of formal nomenclatural designations of subgeneric units. Thus, the designation "Rana liebigii group" denotes a group of species of Rana that are more alike (closely related ?) than any one member of that group is to other Rana. The phylogenetic information is evident without cluttering the classification. On the other hand, if members of the group can be shown to be of monophyletic origin and to have reached an evolutionary differentiation equal to that of the genus in which they have been placed, they should be accorded full generic recognition. On this philosophical basis, the subgenus is an unnecessary and undesirable category.

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Geographic Distribution

Herpetological Review publishes brief notices of new geographic distribution records in order to make them available to the herpetological community in published form. Geographic distribution records are important to biologists in that they allow for a more precise determination of the range of a species, and thereby permit a more significant interpretation of the biology of same. The standard format for a geographic distribution record is:

Scientific name (common name) as it appears in Conant (1956, 1975) or Stebbins (1966). Locality (use metric for distances). Date and collector(s). Identified or verfied by. Place of deposition and catalogue number. Comments. Citation. Submitted by (give name and address).

Please submit new geographic distribution records in the standard format only to Joseph C. Mitchell, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916. Short manuscripts are acceptable when data cannot be adequately presented in the standard format.

Recommended citation for new geographic distribution records appearing in Herpetological Review is: Jones, J. 1977. Geographic distribution: Rana pipiens. SSAR Herp. Review 8(1): 1.

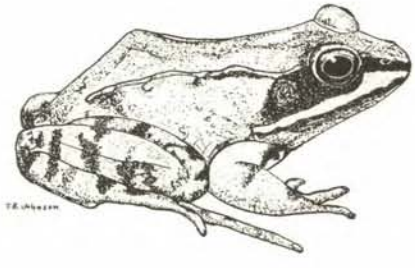
CAUDATA (SALAMANDERS)

AMBYSTOMA TREMBLAYI (Tremblay's salamander). USA. WISCONSIN: Florence Co: 10 km E Newald. 24 April 1976. Ellen Dohr. MICHIGAN: Gogebic Co: 6.6 km E Marenisco (2 spec). 29 May 1976. Chris Rogers. MICHIGAN: Gogebic Co: 8.8 km SSW Watersmeet. 30 May 1976. Jeffrey Briggs. Erythrocyte confirmed. Milwaukee Public Museum 13226-13229 respectively. Extends known range through NE Wisconsin into W Michigan upper peninsula. (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston). Submitted by Jeffrey L. Briggs, Department of Zoology, University of Wisconsin, Milwaukee, Wisconsin 53201.

SALIENTIA (FROGS AND TOADS)

HYLA CRUCIFER (Spring peeper). USA. SOUTH DAKOTA: Bon Homme Co: Springfield. 28 June 1924. E. C. O'Roke. Verified by Stephen D. Busack and George R. Zug, National Museum of Natural History. USNM 68719. First record for the state (Fishbeck and Underhill, 1959, Proc. South Dakota Acad. Sci. 38: 107-113, and Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co; Boston). Submitted by Stephen D. Busack, National Fish and Wildlife Lab, USFWS, National Museum of Natural History, Washington, D.C. 20560.

RANA SYLVATICA (Wood frog). USA. ARKANSAS: Independence Co: 4.8 km W Ark. Rt. 167, E Chinn Springs. 17 June 1968. N. H. Douglas et al. Northeast Louisiana University, NLU 18678. ARKANSAS: Independence Co: Adler Cave. 1 August 1970. D.H. White. NLU 31036. New county record and extends range of isolated records within the state from northwest (Dowling, 1956, Occ. Papers Univ. Arkansas Mus. 19) and central Ozarks (Schuier et al., 1972, Proc. Arkansas Acad. Sci. 26: 61-66) 56.8 km to the eastern border of the Interior Highlands province. Submitted by Henry W. Robison, Department of Biological Sciences, Southern Arkansas University, Magnolia, Arkansas 71753, and Neil H. Douglas, Department of Biology, Northeast Louisiana University, Monroe, Louisiana 71201.



SAURIA (LIZARDS)

IGUANA IGUANA (Common green iguana). USA. GREATER ANTILLES: Puerto Rican Bank, La Cordillera, Cayo Icacos, 1.5 km ENE Soroco, Puerto Rico, 5 m 313v., 18 23N, 16 23W. 5 January 1976. S.D. Garber and J. Moreno. Specimen alive in collection of S.D. Garber. First voucher specimen from Greater Antilles and outer islands. Westward extension of 20 km from its known range on many islands and cays of the Virgin Islands (Schwartz and Thomas, 1975, Carnegie Mus. Spec. Pub. 1: 1-216). Seven individuals observed (4 adults, 3 juveniles). Of the adults (one of which is in the author's collection), the tubercles on the nape, snout squamation, lack of dorsal pattern, and pronounced ventral pattern concur with significant clinal characters that occur in the northwestern Lesser Antilles (Lazell, 1973, Bull. Mus. Comp. Zool. 143). Submitted by S.D. Garber, Department of Natural Resources, Cornell University, Ithaca, New York 14853.

SERPENTES (SNAKES)

ARIZONA ELEGANS ELEGANS (Kansas Glossy Snake). USA. OKLAHOMA: Cimarron Co: 16 km E and 11 km S Kenton, and 8 km E Kenton. 19 August 1976. K.L. Soltesz. Verified by H. M. Smith. University of Oklahoma Museum of Zoology, UOMZ 34829-34830. First records for Cimarron County, and supplements Webb (1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Submitted by Kenneth L. Soltesz, Denver Zoological Gardens, Denver, Colorado 80205.

MASTICOPHIS TAENIATUS TAENIATUS (Desert striped whipsnake). USA. COLORADO. Delta Co: 23 km WSW Delta (Capt. H.A. Smith Cabin, 2.4 km NE jct Escalante Canon road and Delta-Montrose county line), 1615 m elev. 15 May 1975. R.L. Holland, B. Evans, and M. Henry. Verified by R.L. Holland, University of Colorado Museum, UCM 51308. First record for the county, and extends range into the Gunnison River drainage (H.M. Smith, pers. comm.). Submitted by Richard L. Holland, Boulder High School, Boulder, Colorado 80302.

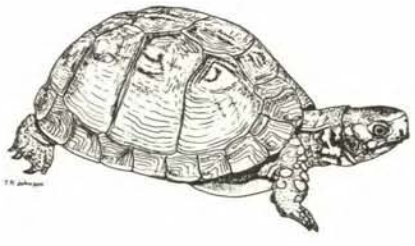
NATRIX CYCLOPION CYCLOPION X FLORIDANA (Green water snake). USA. ALABAMA: Baldwin Co: Gulf State Park, Gulf Shores. 1 October 1976. W.E. Cooper and G. Behrens. Auburn University at Montgomery, uncataloged. The specimen was captured at the boundary recorded between N.c. cyclopion and N.c. floridana (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston). Although Goff (1936, Occ. Papers Mus. Zool. Univ. Michigan 237: 1-11) predicted that intergrades would be found between Mobile, Alabama, and Leon County, Florida, he was unable to find evidence of intergradation. However, Mount (1975, The reptiles and amphibians of Alabama, Auburn Univ. Agric. Exp. Sta. Pub. Alabama) reported that a slight darkening of the venter in specimens from southeastern Baldwin County. In other respects, the specimens were typical of N.c. floridana. The specimen noted here is also similar to typical N.c. floridana except for its ventral coloration. Both subspecies have a plain white to yellow coloration on the anterior third of the venter. In N.c. cyclopion the plain color gives way to a brown to gray pigment with light half-moons or spots. The venter of N.c. floridana is plain or nearly so except for the subcaudals, which show the dark pigment with light half-moons, as in N.c. cyclopion. The specimen reported herein has a yellowish anterior venter which rapidly gives way to darker pigmentation posteriorly. However, distinct half-moons do not appear until just anterior to the anus. The appearance of this specimen and

those reported by Mount suggest that there is intergradation between the two subspecies in the region predicted by Goff. Intensive collections in this area will be required to establish the geographic and meristic extents of intergradation. Submitted by William E. Cooper, Jr., Department of Biology, Auburn University at Montgomery, Montgomery, Alabama 36109.

TANTILLA NIGRICEPS NIGRICEPS (Plains black-headed snake). USA. COLORADO: Lincoln Co: 2.5 km E and 2 km S Karval. 22 May 1976. J.D. Holmes. Verified by H.M. Smith. University of Colorado Museum, UCM 51484. First record for Lincoln County. Submitted by Kenneth L. Soltesz, Denver Zoological Gardens, Denver, Colorado 80205, and Jeffrey D. Holmes, Air Academy High School, USAF Academy, Colorado Springs, Colorado 80840.

TROPIDOCLONION LINEATUM (Lined snake). USA. OKLAHOMA: Cimarron Co: Carl Etling State Park. 1 September 1974. E. Wilson. Verified by C.C. Carpenter. University of Oklahoma Museum of Zoology, UOMZ 34348. OKLAHOMA: Cimarron Co: 9.3 km N Kenton. 21 August 1976. K.L. Soltesz. Verified by H.M. Smith. UOMZ 34828. First voucher specimens from Cimarron County, and the Oklahoma panhandle. Previously reported from Cimarron County by Blair (1950, Copeia: 234) but no specimens were retained. Submitted by Kenneth L. Soltesz, Denver Zoological Gardens, Denver, Colorado 80205.

SISTRURUS MILIARIUS STRECKERI (Western pygmy rattlesnake). USA: MISSOURI: Douglas Co: 5 km N Vanzant. 25 November 1976. D. Bergerhouse. Verified by J.K. Tucker. Private collection of G.L. Paukstis. Extends range 47.2 km N and 70.4 km NW of nearest recorded localities (Anderson, 1965, Reptiles of Missouri, Univ. Missouri Press, Columbia). Submitted by Gary L. Paukstis, Department of Biological Sciences, Illinois State University, Normal, Illinois 61761.



News Notes

PISANI NEEDS DIRT

Herpetological Review co-editor George R. Pisani is preparing a special satirical issue to be distributed at the 1977 SSAR-HL-KHS annual meeting in Lawrence, Kansas. Persons interested in contributing material of an appropriately sacrilegious nature should have it reach George before 31 May 1977. All suitable material which can't be fit into this year's issue will be held in the hope that this publication will become a fearfully anticipated annual event. See the inside front cover for George's address.

GEORGIA HERPETOLOGICAL SOCIETY

The Georgia Herpetological Society (formerly the Southeastern Herpetological Society) has recently been organized. Membership in the GHS is open to anyone interested in amphibians and reptiles. Members receive the Journal of the Georgia Herpetological Society (4-5 issues per year). Membership is $8.00 per year, and should be remitted to: John C. Zegel, GHS, 5341 Smoke Rise Drive, Stone Mountain, Georgia 30087.

WANTED: HERPETOLOGICAL PAPERS FOR PUBLICATION

The Chicago Herpetological Society desires manuscripts on natural history, conservation, husbandry and other topics of herpetological interest. Papers written for herpetology, ecology, animal behavior or biogeography classes may be suitable for publication and of interest to the CHS membership. Material of a highly technical nature which would normally be published in a professional journal is discouraged. Requests for information and manuscripts should be sent to John Murphy, Publications Secretary, Chicago Herpetological Society, 2001 North Clark Street, Chicago, Illinois 60614.

BIOLOGY OF THE REPTILIA: VOLUME VII

Carl Gans advises that Volume VII of the Biology of the Reptilia is now in press and Volume VIII should go to the printers in October. The editors have prepared a complete listing of present and proposed chapters and volumes coupled with a questionnaire designed to elicit comments and suggestions from herpetologists and vertebrate biologists generally. A copy may be obtained by sending a stamped (15¢) self-addressed envelope to him, at: Division of Biological Sciences, University of Michigan, Ann Arbor, Michigan 48109.

NICARAGUAN AMPHIBIANS

Plans are underway for a second edition of Villa's "Anfibios de Nicaragua." A special effort will be made to revise and update the first edition. If you have comments, suggestions, unpublished records or information, or unusually good color photographs of Nicaraguan amphibians, please contact by foreign air mail, as soon as possible: Jaime Villa, Apartado Postal 427, Managua, Nicaragua.

ASIH AT GAINESVILLE, FLORIDA

The 57th annual meeting of the American Society of Ichthyologists and Herpetologists will be held on 19-25 June 1977 at the University of Florida, Gainesville. Individuals interested in attending this meeting or obtaining additional information should contact: Carter Gilbert, ASIH Local Chairman, Florida State Museum, University of Florida, Gainesville, Florida 32611.

CINCINNATI COLLECTION RETURNS TO MUSEUM

The preserved collection of amphibians and reptiles of the Cincinnati Museum of Natural History, accumulated by Dury, Weller, Maslowski and others during the 1930-1950 period, has been officially transferred from the University of Cincinnati (UC) to the Museum. UC obtained the collection from the CMNH in 1957 on a long term loan. This collection ranks with those at the University of Louisville and the University of Kansas in containing the largest and most important collections of amphibians and reptiles from Kentucky. Interested individuals may obtain more information about the collection by contacting: Dr. R.A. Davis, Cincinnati Museum of Natural History, 1720 Gilbert Avenue, Cincinnati, Ohio 45202.

TURTLE HOBBYIST NEWSLETTER AVAILABLE

A monthly newsletter directed to those that keep turtles and tortoises in captivity has recently been published. Titled, "Turtle Hobbyist," the newsletter is published by Christel Pfeiffer and Mary Trotter, 5163 East Bedford Drive, San Diego, California 92116. The publication is intended to assist hobbyists with the proper maintenance of turtles, and will suggest methods of housing, breeding, diet, and preventative health methods. The six to eight page newsletter is published monthly, and is $5.00 per year or 50¢ per issue for sample copies. For additional information, write to: Turtle Hobbyist, 5163 East Bedford Drive, San Diego, California 92116.

PRESSURE FROM PET TURTLE INDUSTRY

Last May the Food and Drug Administration, contending that pet turtles carry salmonella, banned their sale in the USA. But the $8-million industry, based in Louisiana, has not taken the ban lying down. The National Turtle Farmers and Shippers Association, Inc., represented by the state attorney general, filed suit to have the ban lifted. When the FDA challenged the state's right to sue on behalf of the industry, the U.S. District Court ruled the suit was valid. Now the original case is awaiting reassignment following the judge's untimely death.

Meanwhile the industry, chiefly with the aid of microbiologist Ronald J. Siebeling and a NOAA Sea Grant, is hard at work developing a method for producing salmonella-free turtles. According to an article by Sally Kuzenski in a recent issue of Sea Grant '70s, Seiberling in his research at Louisiana State University (LSU) has already found one technique that works. He took about 30,000 freshly laid turtle eggs and chilled them in an antibiotic solution, which was drawn into the eggs as the cooling progressed. The hatchlings remained germ-free for the eight months they spent in the laboratory.

Now Siebeling is working on what may be an even better method. The gases are removed from cleansed eggs that have been placed in a vacuum tank. Then the eggs are soaked in gentamicin (the FDA-approved antibiotic used in treating turkey eggs) and incubated in sterile containers instead of the soil-sawdust-peat moss mixture previously used. Since the farmers themselves have been applying the method--"The LSU labs have been used only for analysis," says Siebeling--they won't need to be convinced of its efficiency or effectiveness in producing salmonella-free turtles. Their hope, then, is that through the courts they can convince the government that the turtles are now safe and can be sold again as pets.

...from BioScience (27(1): 68.

FORT WORTH ZOO NEEDS RHINOBOTHRYUM

Since March of 1974, the Fort Worth Zoological Park has maintained a single adult female specimen of Rhinobothryum bovalli (Serpentes: Colubridae), supposedly from Costa Rica. As far as we know, this is the only living specimen of this species in the United States. We would very much like to obtain a male, and would appreciate hearing from anyone who presently has or has access to additional living specimens. Contact: Bern Tryon, Fort Worth Zoological Park, 2727 Zoological Park Drive, Fort Worth, Texas 76110.

PYTHON DATA NEEDED

The Institute for Herpetological Research is collecting data on mating and reproduction of pythons, for the purpose of maintaining a data bank. Pre-stamped data questionnaires will be sent at no charge to institutions or individuals who have had experience in python reproduction and wish to share this information. Address inquiries to Richard Ross, M.D., Director, Institute for Herpetological Research, P. O. Box 2227, Stanford, California 94305.

COSTA RICAN HERP PROJECT

The Departmento de Ciencias Forestalas, Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) in Turrialba, Costa Rica, needs assistance in a series of 14 studies that they wish to carry out in the CATIE area. One of the studies involves a survey of the amphibians and reptiles, and will result in the publication of an illustrated guide to the common herpetofauna of the CATIE area. CATIE is able to provide laboratory space and perhaps some limited field assistance with the study. No salary or stipend money is available. Because living and working facilities at CATIE are already established, it would be possible for investigators to immediately get to work without worrying about logistical problems in the field. Interested persons may obtain additional information about this project by contacting: Dr. Gerado Budowski, Jefe del Departamento de Ciencias Forestales, Centro Agronomico Tropical de Investigacion y Ensenanza, Turrialba, Costa Rica, Central America.

NEW YORK ZOO TORTOISE BREEDING

The trio (⅓) of Radiated tortoise pooled in a breeding program by the New York Zoological Society and Dr. William H. Zovickian has produced 9 hatchlings from 13 eggs in 1976. Two 6-egg clutches laid late in the season are still incubating.

The eggs were incubated at 29°C. in a chicken egg incubator and hatched in 90-106 days. Four hatchlings emerged from a 5-egg clutch laid by one female, and five hatchlings resulted from 8 eggs (two clutches) laid by the other female. The adult tortoises and hatchlings are maintained by Dr. Zovickian in Sharon, Connecticut.

A similar program for breeding Geochelone yniphora has been initiated, but additional specimens, especially mature females, are needed.

CHANGE IN ALLIGATOR STATUS

On January 10, 1977, the USDI Fish and Wildlife Service announced in the Federal Register (42 FR 2071-2077) the determination that the American alligator is reclassified to be a Threatened species in all of florida and certain coastal areas of South Carolina, Georgia, Louisiana, and Texas. The exact boundaries of the Threatened populations may be found on p. 2077 in 17.42(a)(2)(iv) of the Special Rules. Alligators in all other portions of the species' range remain Endangered, except in Vermilion, Cameron, and Calcasieu Parishes, Louisiana, and in captivity wherever found, where they have been previously determined to be Threatened by Similarity of Appearance only.

Particular attention is called to the other provisions of the Special Rules applicable to the Threatened alligators. These rules provide that duly authorized Federal or State employees or agents may, in the course of their official duties, take without a permit, Threatened alligators which are sick, injured or orphaned. Furthermore, a permit would not be needed to lethally take a Threatened alligator which constitutes a threat to human safety, provided that live-capturing or other means of handling the problem are not feasible. Such employees or agents may also dispose of or salvage dead specimens. Finally, the rules provide that in any State operating under a Cooperative Agreement with the Fish and Wildlife Service, designated employees or agents may take Threatened alligators in the course of scientific research or conservation programs, and the hides of alligators so taken may be sold by the State, after they have been properly tagged and recorded, to federally licensed buyers. In all other respects, Threatened alligators continue to receive the same protection provided to Endangered alligators by the Endangered Species Act of 1973.

ERRATA

Second generation reproduction and courtship behavior in the Trans-Pecos ratsnake, Elaphe subocularis. HR 7(4): 157, para 3, line 6, "19958)" should read (1958).

Notes on reproduction in captive Lampropeltis triangulum nelsoni (Serpentes: Colubridae). HR 7(4): 162, Literature Cited, delete the reference to Trapido, H. 1940, and change Tyron, B.W. 1975 from "Herp" to Bull. New York Herp. Soc.; Table 1 caption, change "date" to read data.

Current Literature

As of January, 1977, approximately 70 searchers are scanning 400 journals. Titles will be published four times per year. Searchers are encouraged to submit titles for inclusion at three month intervals to assure approximately equal listings in HR. Any correspondence concerning the Current Literature Project should be sent to

Richard D. Worthington
Current Literature
Department of Biological Sciences
The University of Texas at El Paso
El Paso, Texas 79968

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AIMAR, C., F. X. DESVAUX and M. TH. CHALUMEAU-LE-FOULGOC
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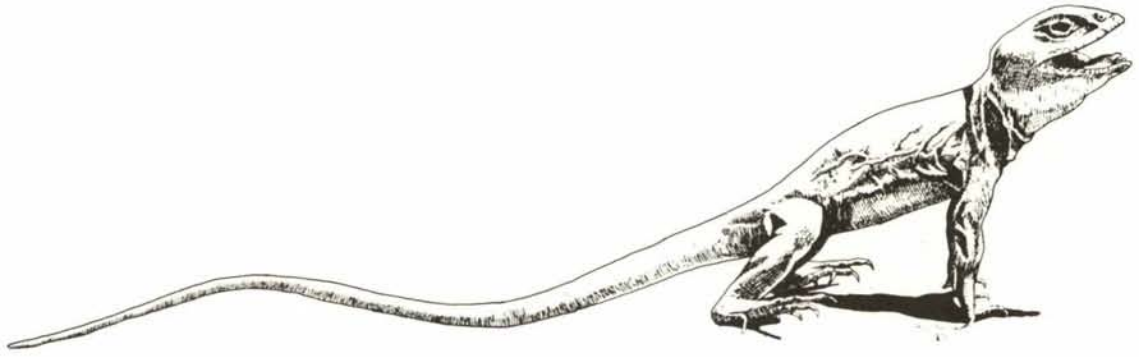
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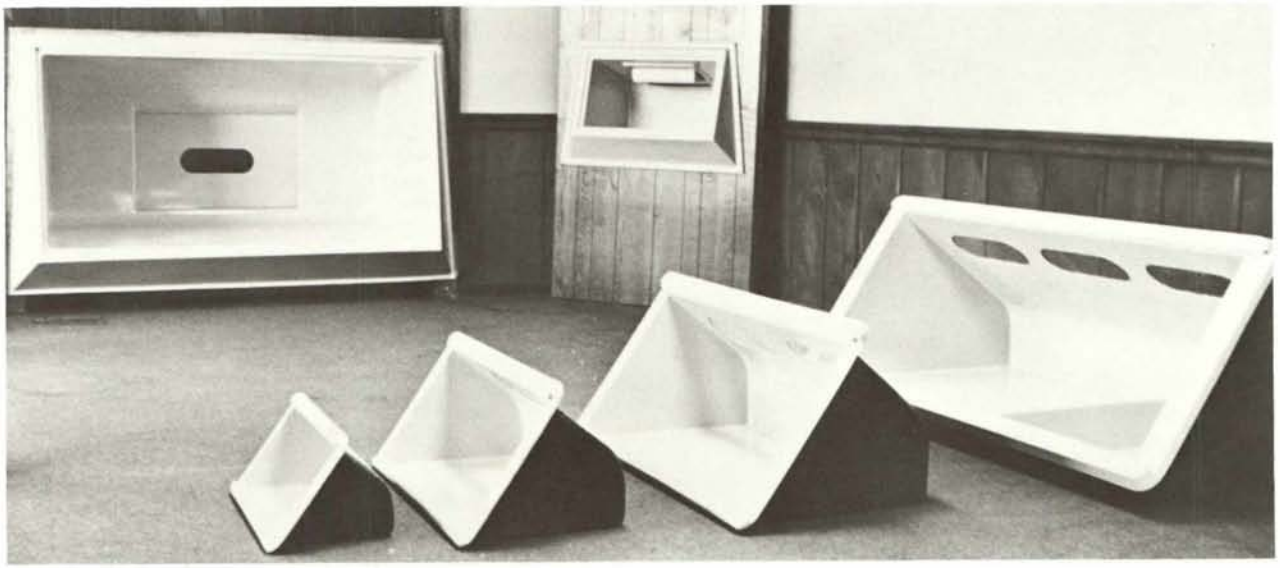
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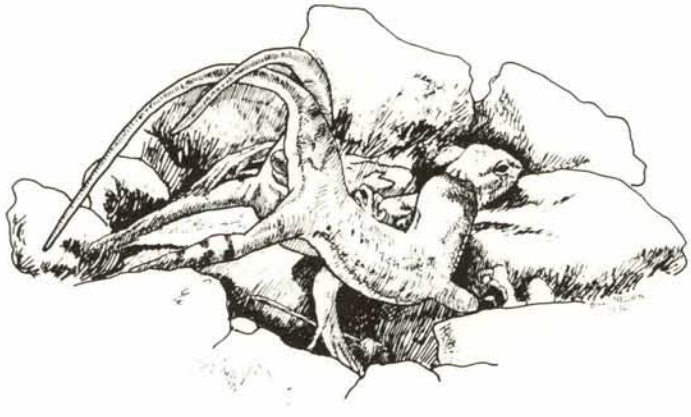
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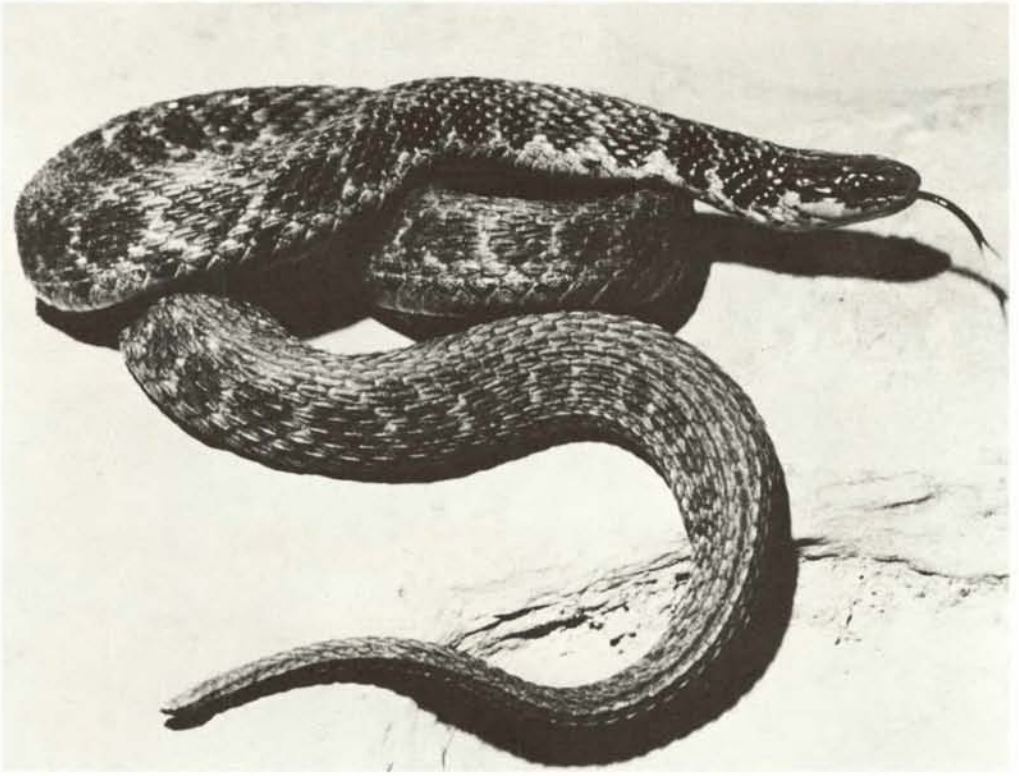
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Kirtland's Snake (Clonophis kirtlandi). An adult taken within the city limits of Cincinnati, Hamilton County, Ohio. This small, secretive snake lives beneath rocks and logs on hilly, wooded ravines, and feeds primarily on earthworms. Photograph by J. T. Collins.



Small-mouthed Salamander (Ambystoma texanum). A gravid female collected near Indian Hill, Hamilton County, Ohio. This salamander is extremely common in southwestern Ohio. In that region it breeds in streams due to competition from other species of Ambystoma which utilize available pond sites. Photograph by Corson Jay Hirschfeld.

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The following statement-of-purpose appeared in the Introduction to the first issue of Herpetological Review in 1967 (Corson Hirschfeld, Editor):

> "Herpetological Review incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the Review will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to all persons in herpetology and we hope all members will find it informative and entertaining."

Now in its tenth year, Herpetological Review remains true to that purpose. We will continue to publish semi- and non-technical articles (original research should be submitted to the Journal of Herpetology -- see inside front cover for address), book reviews, institutional and regional society news, research requests of SSAR members, letters from readers directed to the field of herpetology, illustrations, and photographs. Authors are urged to write the editors before submitting feature-length articles. Unpublished photographs of an unusual nature or of uncommon amphibians and reptiles are desired. Submissions should be black-and-white, 8 X 10, glossy prints, and should be accompanied by a descriptive caption and exposure data. The name and address of the contributor should be taped or penciled on the back of each print. Please DO NOT send photographs before corresponding with the editors about them. Return of unsolicited photographs cannot be guaranteed unless adequate return postage is provided. Unused photographs which the editors have requested to examine will be returned at our cost.

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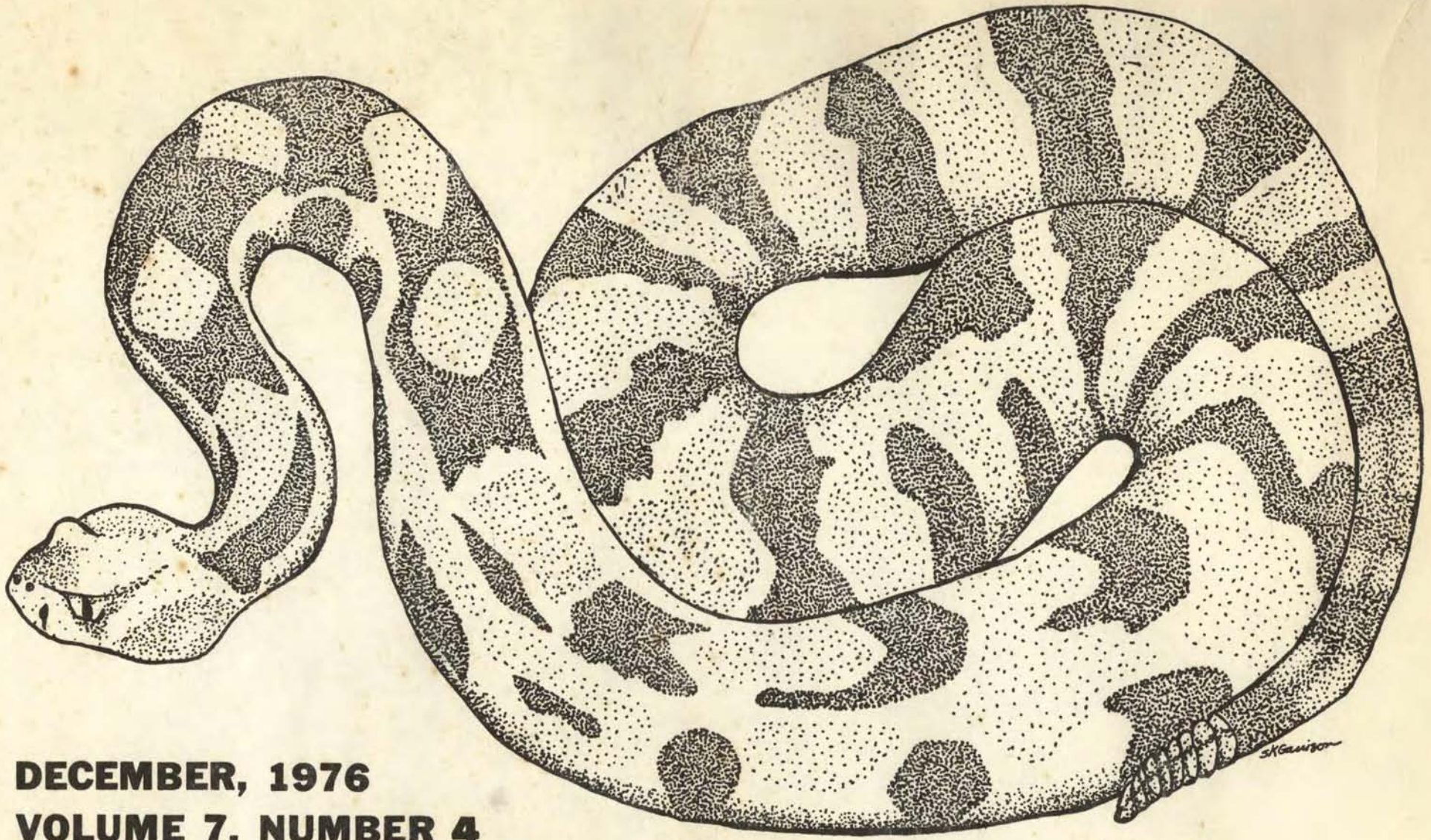
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Volume 7, Number 4
December, 1976

TABLE OF CONTENTS

LETTER TO THE EDITOR *by J. Kevin Bowler* 154

SECOND GENERATION REPRODUCTION AND COURTSHIP BEHAVIOR IN THE TRANS-PECOS RATSNAKE, *ELAPHE SUBOCULARIS by Bern Tryon* 156

F.W. PUTNAM'S ORIGINAL DESCRIPTION (1862) OF A DOUBLE-HEADED, BISEXUAL BLACK RACER (*COLUBER CONSTRICTOR* LINN.) - A HISTORICAL RECORD *by Ralph W. Dexter*. 158

NOTES ON REPRODUCTION IN CAPTIVE *LAMPROPELTIS TRIANGULUM NELSONI* (SERPENTES;COLUBRIDAE) *by Bern W. Tryon and Terry G. Hulsey* 161

WEST MALAYSIAN TURTLES: UTILIZATION AND CONSERVATION *by Edward O. Moll* 163

WORM SNAKES IN THE DIET OF A TOAD, *BUFO MELANOSTICTUS by Donald E. Hahn* 167

GRANTS AVAILABLE FROM THE SAVANNAH RIVER ECOLOGY LABORATORY 167

AN UNUSUAL BASISPHENOID IN ONE SPECIMEN OF *GRAPTEMYS FLAVIMACULATA* *by Flavius C. Killebrew* 167

SKELETAL PREPARATION OF HERPETOLOGICAL SPECIMENS *by Susan DeSanctis Rhodin, et al* 169

COLOR PRESERVATION IN SALAMANDERS *BY Ladislao A. Guerra* 170

LATE SEASON HATCHING SUCCESS OF *ELAPHE O. OBSOLETA* *by Owen J. Sexton, et al* 171

BUFO DAPSILIS MYERS AND CARVALHO, SECOND KNOWN SPECIMEN AND NEW TO PERU *by James R. Dixon* 172

LEPIDODACTYLUS LUGUBRIS (REPTILIA:GEKKONIDAE): A RECENT ADDITION TO THE HERPETOFAUNA OF NICARAGUA *by Robert W. Henderson, et al* 173

HERPETOLOGISTS, AMPHIBIANS, AND REPTILES AND THE ENDANGERED SPECIES ACT OF 1973 *by C. Kenneth Dodd, Jr.* 174

GEOGRAPHIC DISTRIBUTION 177

BOOK REVIEW - MORE ON NESSIE: A REVIEW OF *THE MONSTERS OF LOCH NESS* AND *THE LOCH NESS STORY...George R. Zug* 181

SIGMA XI GRANTS IN AID OF RESEARCH AWARDS FOR 1975-76 IN "HERPETOLOGY" 182

SSAR ELECTION RESULTS 183

NEOTROPICAL NEWS 183

IN THE NEWS 183

CURRENT LITERATURE 185

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Dr. Max Nickerson
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Dear Dr. Nickerson:

I hope that the SSAR will support the National Audubon Society's recommendation to relocate American alligators. The American alligator is an aquatic animal, and theoretically at least, the ecological barriers separating "coastal" alligators from "inland swamp" alligators are poorly defined. I believe that these barriers are non-existent in some situations.

The alligator has made a successful recovery in parts of it's range, however, it is still completely extirpated, or is much reduced in numbers, in other areas.

It will be necessary to "transplant" alligators to some of these areas, if we want to re-establish the species throughout it's former range (with the possible exception of Miami and New Orleans).

I do not think that the transport and release of "coastal" alligators to inland habitats will result in their cruel death.

The alligator is a very tenacious animal, and one is on record (Barton, 1955) as probably surviving for at least six years in an Allegheny County, Pennsylvania swamp. This animal was finally shot by a local peace officer. Please do not interpret this to mean that I am suggesting that alligators be released in Pennsylvania, I merely mention this to support my contention that alligators are very adaptable creatures. Habitat manipulation is not necessarily wrong. State and Federal Game Departments have long used such methods to restore depleted species.

Finally, the reintroduction of American alligators to suitable habitats within their natural range can hardly be equated to the introduction of exotic species.

Sincerely yours,

J. Kevin Bowler

J. Kevin Bowler
Curator of Reptiles

TO THE SOCIETY,

This issue of Herpetological Review ends my editorship and the total publication services provided to SSAR by the Milwaukee Public Museum. It is somewhat ironic that this is the first issue of Herpetological Review to be fully composed. We were fortunate to obtain a grant from the Walter and Olive Stiemke Foundation, of Milwaukee, for the purchase of a Compugraphic Compuwriter II TG (Figure 1). With this machine we can produce a more professional appearing copy, reduce the amount of time needed to produce photoready copy and increase the amount of copy per page.



Figure 1. Ms. Susan Pleskatcheck operating Compugraphic Compuwriter II.

The next issue will be produced under the co-editorship of Joseph T. Collins and George R. Pisani of the University of Kansas, Lawrence. Richard Worthington of the University of Texas-El Paso will assume the responsibility for the Current Literature. They have already begun the production of HR 8(1) and the Society is fortunate to have such capable individuals willing to donate their efforts.

Donated effort has been the trademark in the production of Herpetological Review at Milwaukee. I gratefully acknowledge the assistance and support of MPM administration and the HR Section Editors. On behalf of SSAR and HR I personally thank Susan Pleskatcheck, Robert Henderson, Richard Sadjak, Teresa Noeske, Stephen Yeo, Nathan Kraucunas, Milton Spearbraker, Vivian Muench, Jon Shapiro, Cheryl Castelli, Janice Mahlberg, Karen Slowiak, Barbara Villa, Sue Kraegel and the host of others who have made publication possible. It has been fun...anguish...and really quite an experience.

HAPPY HOLIDAYS,

MAN

EDITOR, H.R.

SECOND GENERATION REPRODUCTION AND COURTSHIP BEHAVIOR IN THE TRANS-PECOS RATSNAKE, *ELAPHE SUBOCULARIS*

Although captive breeding of the Trans-Pecos ratsnake, *Elaphe subocularis,* has been recorded (Campbell, 1972), there are no reports of captive bred second generations. The present report deals with successful second generation captive reproduction of this species in two consecutive years with notes on courtship, care and growth of the young.

An adult male *E. subocularis,* collected 19 June 1968 12 miles north of Shafter, Texas on Highway 167, and an adult female, collected 16 July 1968 10 miles north of Fort Davis, Texas on Highway 17, were presented to the Dallas Zoo. Although no copulation was observed, the female laid six eggs on 6 April 1973. On 21 July 1973, after a 105-day incubation period, five of the six eggs hatched. On 12 June 1974, a pair of these juveniles was presented to the Fort Worth Zoo.

The young *Elaphe subocularis* were housed together on exhibit in a 3 foot fiberglass cage (Hulsey, 1974), with pea gravel, several small rocks and plastic plants added for decoration and to act as retreats for the young snakes. Although no courtship was observed, on 8 May 1975 the pair was in active copulation. After a slight disturbance, the two snakes quickly separated and were not seen to copulate after this date. On 19 May the pair was weighed on a triple beam balance, and measured using the squeeze box technique (Quinn and Jones 1974). Total lengths and weights of adult and juvenile snakes are given in Table 1.

The female readily accepted food weekly after copulation, and although she was becoming noticably larger posteriorly, it was doubted that *E. subocularis* of this size and age could be gravid. However, on the morning of 11 June 1975, a clutch of three large non-adhering eggs was laid near the rear of the cage and water bowl, and the female was coiled partially about them. The eggs were immediately removed and no aggressive behavior was displayed by the female. The three eggs were soft, white in color and somewhat moist, indicating they had been laid no more than one hour before discovery. Egg diameter varied from 19 mm to 21 mm (mean 20.3 mm), egg length varied from 62 mm to 73 mm (mean 66.0 mm), and egg weight varied from 17.9 g to 18.9 g (mean 18.3g).

The eggs were placed but not completely covered in a medium of four oz. of vermiculite and four fl. oz. of water in well-sealed one gallon jars (Tryon, 1975). These were then placed in an incubator in which the temperature fluctuated between 28 and 32 C. At approximately two week intervals the jars were opened briefly to replenish the oxygen. On 12 August 1975, after 63 days, eggs 1 and 2 developed slight indentations, and on 15 August, an indentation developed on egg 3. At 1300 h, 21 August, one longitudinal slit appeared in egg 3 and at 0800 h, 22 August, several slits were noted in all three eggs. The young snakes remained inside the eggs approximately 24 hours before emerging. Incubation times were 73 days for eggs 1 and 2 and 74 days for egg 3. All three snakes shed for the first time on 1 September.

The hatchling snakes were housed in a 1 foot fiberglass cage (Hulsey, 1974), and substrate and cage props closely paralleled those of the parent snakes' enclosure. Feeding on newborn mice took place at weekly intervals. At approximately six months of age all three juveniles began accepting small, pre-killed furred mice, but only if fed immediately prior to this on a live, hairless mouse. At one year of age, all juveniles were feeding entirely on small, pre-killed mice. During the first eight months after hatching, the snakes were fed individually in gallon jars to assure that each could feed without competition. Weights and measurements were recorded at seven months and twelve months of age.

The parent *E. subocularis* remained together on exhibit without further observed sexual activity until 26 June 1976. Then both snakes were extremely excited and moving rapidly about the cage. The male was aggressively pursuing the female, and upon locating her, he would bite any exposed portion of her body. This activity continued throughout the day but no copulation was observed. Gillingham (1974) noted that male western fox snakes, *Elaphe v. vulpina,* exhibited biting behavior just prior to and during copulation. It was thought that biting enhanced the receptivity of the female as well as anchored the male in position during coitus. In all cases the female was grasped behind the head, but not until she had signalled her receptivity by stopping after an initial chase.

Present observations indicate that biting is also included in the courtship of *E. subocularis,* only in a more random sequence. During the eight-hour period of observation there seemed to be a continuous chase response. Biting occurred at any time contact was made regardless of the area of the female's body located. Bites were quick, occasionally with some chewing motions, and appeared quite hard. Several seconds after biting had been initiated, the female resumed her flight, the male released his grip, and the chase began once more. At no time during observation did the male attempt copulatory position. As in *E. v. vulpina* (Gillingham, 1974), it is thought that biting activity in *E. subocularis* is used as a further stimulus to initiate receptiveness in the female, and not as a restraining measure. Because further courtship activity was not noted after 26 June 1976, it was assumed that copulation occurred during that night. In 1975, biting behavior was not observed when copulation took place.

The adults were weighed and measured on 4 July 1976. On 13 July, a bowl filled with damp sphagnum moss was placed in the cage to provide a deposition site. The female began spending more time in the bowl until 31 July when she was discovered beneath the sphagnum coiled around a clutch of four non-adhering eggs. The eggs were identical in appearance to those described above.

Incubation procedure was the same. Egg diameter varied from 22.0 mm to 24.0 mm (mean 23.0 mm), egg length varied from 60.0 mm to 73.0 mm (mean 66.0 mm), and egg weight varied from 21.5 g to 23.6 g (mean 22.6 g).

On 4 October 1976, egg 3 appeared indented dorsally, and at 0800 h, 12 October, it was noted that egg 4 had been slit several times and the snake's head was exposed. Between 0900 h and 1300 h, eggs 1 and 3 slit and the snakes' heads were exposed. At 1500 h, hatchling 3 emerged after an incubation time of 74 days. At 1800 h, 13 October, hatchlings 1 and 4 were coiled outside the egg on the vermiculite, and egg 2 was slit. Incubation time was 75 days. Hatchling 2 emerged at 0800 h, 14 October. Incubation time was 76 days.

Fitch (1970) states that within the genus *Elaphe* there are notable differences in the lengths of time required from hatching to sexual maturity. These range from less than two years in species such as *E. quadrivirgata* and *E. guttata* (in captivity) to four years in *E. obsoleta.* Bechtel and Bechtel (19958) found that in both sexes of *E. guttata*, sexual maturity is attained in approximately 18 months, and that females raised in captivity consistently laid their first clutches at two years. It is apparent that *E. subocularis* is similar to *E. guttata* in this respect but, as suggested by Fitch (1970), perhaps their development was accelerated by the prolonged season of activity and feeding that captivity affords.

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I wish to thank the staff of the reptile department at the Fort Worth Zoo for making this paper possible, especially J.P.Jones for recording a portion of the data in my absence. I am also indebted to James B. Murphy of the Dallas Zoo for information regarding the original pair of *E. subocularis* donated by Luther Sims.

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Table 1. Total lengths and weights of F_1 Parent T(a) and F_2 Juvenile(b) *E. subocularis* for two consecutive years.

		LENGTH (mm)			WEIGHT (g)		
		1975		1976	1975		1976
a	male	890		1120	158.0		273.8
	female	850		935	176.2		250.7
		hatching(1975)	7 months	12 months	hatching	7 months	12 months
b	1	331	525	720	14.1	46.5	109.3
	2	332	435	654	14.6	26.0	64.1
	3	357	536	699	14.9	44.1	82.8
			hatching(1976)				1976
	4			373			18.7
	5			372			18.7
	6			375			17.3
	7			380			17.7

F.W. PUTNAM'S ORIGINAL DESCRIPTION (1862) OF A DOUBLE-HEADED, BISEXUAL BLACK RACER (*Coluber constrictor* LINN.) - A HISTORICAL RECORD.[1]

I. Introduction -- Brief biographical sketch of Putnam with special reference to herpetology.

Frederic Ward Putnam (1839-1915) was born at Salem, Mass., and as a boy studied natural history as a hobby. He published his first paper at the age of 16 on the birds of Essex County. The following year, he was appointed Curator of Ornithology for the Essex Institute, where he had for some time assisted Dr. Henry Wheatland, President and guiding light of the Essex Institute. When Louis Agassiz came to the Institute to see the collection of turtles, he was impressed by the young Putnam's knowledge of natural history in general, and turtles in particular. Subsequently, he became a student-assistant of Agassiz at the Lawrence Scientific School of Harvard University. In 1859, Putnam was made Curator of Ichthyology for the Museum of the Boston Society of Natural History. He also served on the Committee for Fishes and Reptiles. In 1864 he returned to Salem as Curator of Vertebrates and Director of the Museum for the Essex Institute. Three years later when George Peabody founded the Peabody Academy of Science, which acquired the scientific collections from the Essex Institute, Putnam was made Director of the new museum. While at the Academy, Putnam became one of the founders of the *American Naturalist* and of the American Society of Naturalists. In the summers of 1873-74, he taught at Louis Agassiz's summer school on Penikese Island. This was formally known as the Anderson School of Natural History, and was the first marine summer school in North America. Following that, Putnam was a member of the Kentucky Geological Survey, for which he studied especially cave vertebrates.

For two years, beginning in 1876, he was part-time Curator of Fishes at the Museum of Comparative Zoology. But from 1875, when he was appointed Director of the Peabody Museum of American Archaeology and Ethnology at Harvard University, he devoted most of the balance of his life to American Archaeology. However, he retained an interest in zoology, especially herpetology, over the remainder of his life (Dexter, 1966).

II. Original Description of Specimen.

In 1862, while a student of Louis Agassiz, Putnam wrote the following description (unpublished until now) and made sketches of a double-headed, bisexual black racer (*Coluber constrictor*) which had been received at the Museum of Comparative Zoology in 1849.

This specimen is still preserved in the herpetology collection and cataloged under Museum No. 20183 M.C.Z. The external genitalia are clearly visible and are illustrated in Putnam's sketch (Fig. 1), but the specimen has never been dissected. While there are other records of axial bifurcation in snakes, this one is unique in that it is bisexual as well as bicephalic. The specimen has been carefully examined by the writer who has made a study of Putnam's original notes and sketch. Putnam wrote,

> "This specimen was given to Professor Agassiz in 1849 by Mr. Wells--it was taken in some part of Massachusetts. It is evidently a young snake and probably not more than a few days from the egg. Its whole length is 8 and 8/10 inches, length of tail 2 and 2/10 inches, length of head 5/10 of an inch, width between eyes 2/10 of an inch, distance from tip of snout to the point of the two heads 7/10 of an inch.
>
> The specimen is perfect in every respect. The scales are all normal excepting a slight indication of division of the abdominal scutellae, by a faint line through the center from point of union of heads to tip of tail.
>
> There is a kind of hump, where the two heads unite about half an inch in height. Seventeen dorsal rows of scales round the neck of each head, round the hump and round the normal body. One hundred and seventy-four abdominal scutellae (with a tendency to divide); about 85 to 90 subcaudal scales.
>
> All young snakes just from, or in, the egg have the penis protruded and there are generally two penes--now in this specimen there is a penis protruded on the right side, while on the left side as far as can be seen without dissection is a female second opening. The umbellicus is not yet closed and is situated about one inch from the anal opening and occupies the space of three of the scutellae.
>
> The mouth and throat seem to be perfectly formed in both heads. The teeth are small, but well developed for a young snake. The color is the normal color of young black snakes--58 distinct dark blotches saddling the back from head to anus, from here to end of tail the dorsal portion is of a much darker brown color which also extends forwards upon the scales under the dorsal blotches to near the center of the body. On the sides and on the abdominal scutellae of the anterior 2/3 of the body are small, dark, grayish spots about the size of small pinheads--irregularly placed along the sides. The rest of the under-side is of a dirty white. The general color is of a dirty gray with the blotches darker."

III. Subsequent Studies.

Jeffries Wyman (1865) reported at a meeting of the Boston Society of Natural History, 21 January 1863, on two anomalous snake specimens. Included was the black racer (M.C.Z. 20183) described, but unpublished, by

Putnam the year before. The proceedings stated that "Prof. Wyman exhibited drawings of two specimens of monstrosity in serpents. One of these, presented to him by Professor Agassiz, was of a young black snake, (*Coluber constrictor*) which had two complete heads united to a single trunk. The vertebral column was double for the short distance behind the head, and over the same region the transverse black bands, usually found in the young of this species, were divided lengthwise." R.H. Johnson (1901) described 13 two-headed snakes and reviewed others previously published. He mentioned very briefly the specimen of black racer reported by Wyman as mentioned above and illustrated it with an x-ray photo, but did not describe it. He added nothing to Wyman's incomplete account and named the specimen *Bascanium constrictor* Linn. Five cases of cephalic bifurcation of this species were listed.

Bert Cunningham (1937) published a monograph on "Axial Bifurcation in Serpents" which was "A historical survey of serpent monsters having part of the axial skeleton duplicated." He showed that the oldest record goes back to Aristotle in the fourth century B.C. and provided a bibliography of 101 references to original descriptions of bicephalism published between 1545-1932. The total number of fully authenticated records numbers 170. More records were obtained from the United States than any other country. Cunningham suggests that bicephalism was "caused by a partial separation of the two blastomeres formed at the first cleavage or in telolecithal eggs by a partial splitting of the embryonic disc at some comparatively early stage." Unaware of Putnam's study, he illustrated the snake and wrote that "Wyman recorded a two-headed *Coluber constrictor* given him by Agassiz, but he neither described it in detail nor secured it, probably because a more interesting monster was reported in the same article [actually it was an oral report given at a meeting]." At a later time when the black racer described here was examined and x-ray photographed by Johnson (1901) under the name of *Bascanium constrictor* Linn., he wrote, "This specimen found its way to the Warren Museum of the Harvard Medical School and then to the Museum of Comparative Zoology of Cambridge, Mass., from which it was borrowed by me to make the dorsal view shown in Fig.51, Plate V, and the x-ray photograph shown in Fig. 52. The animal is 10 inches in length, and the left neck is slightly longer than the right and has more vertebrae." However, Putnam's unpublished description still remains the most complete one recorded for this specimen.

[1] This paper was read at meetings of the Ohio Academy of Science held at Marietta College 21 April 1972. My thanks go to the family of F.W. Putnam for the privilege of quoting from his personal papers.

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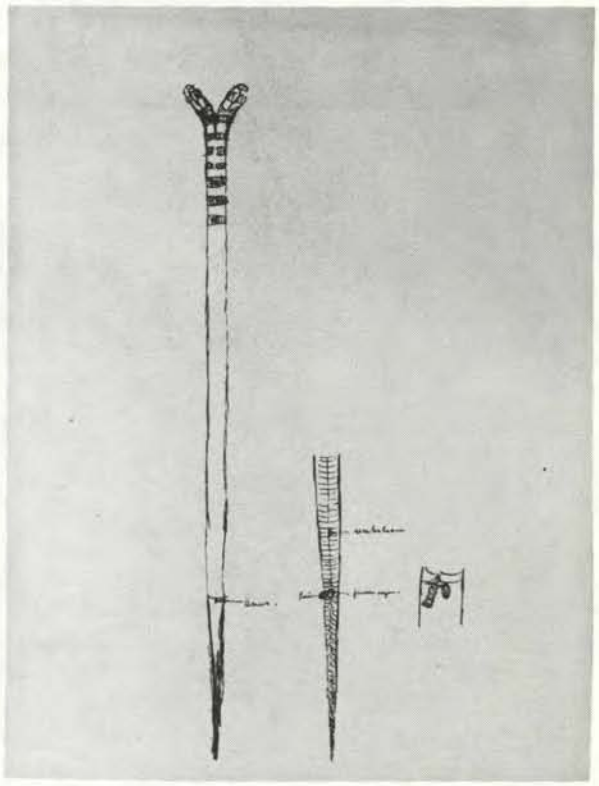


Fig. 1. Double-headed,bisexual Black Racer. Putnam's notes on figure read: "Young *Coluber constrictor* Linn. natural size. Specimen sent to Professor Agassiz by Mr. Wells 1849. Taken in Massachusetts; given to Professor Wyman April 5, 1862. Notes taken April 5, 1862." Labels read: Anus, umbellicus, penis, female organ.



Fig. 1 Hatchling snakes and eggs.

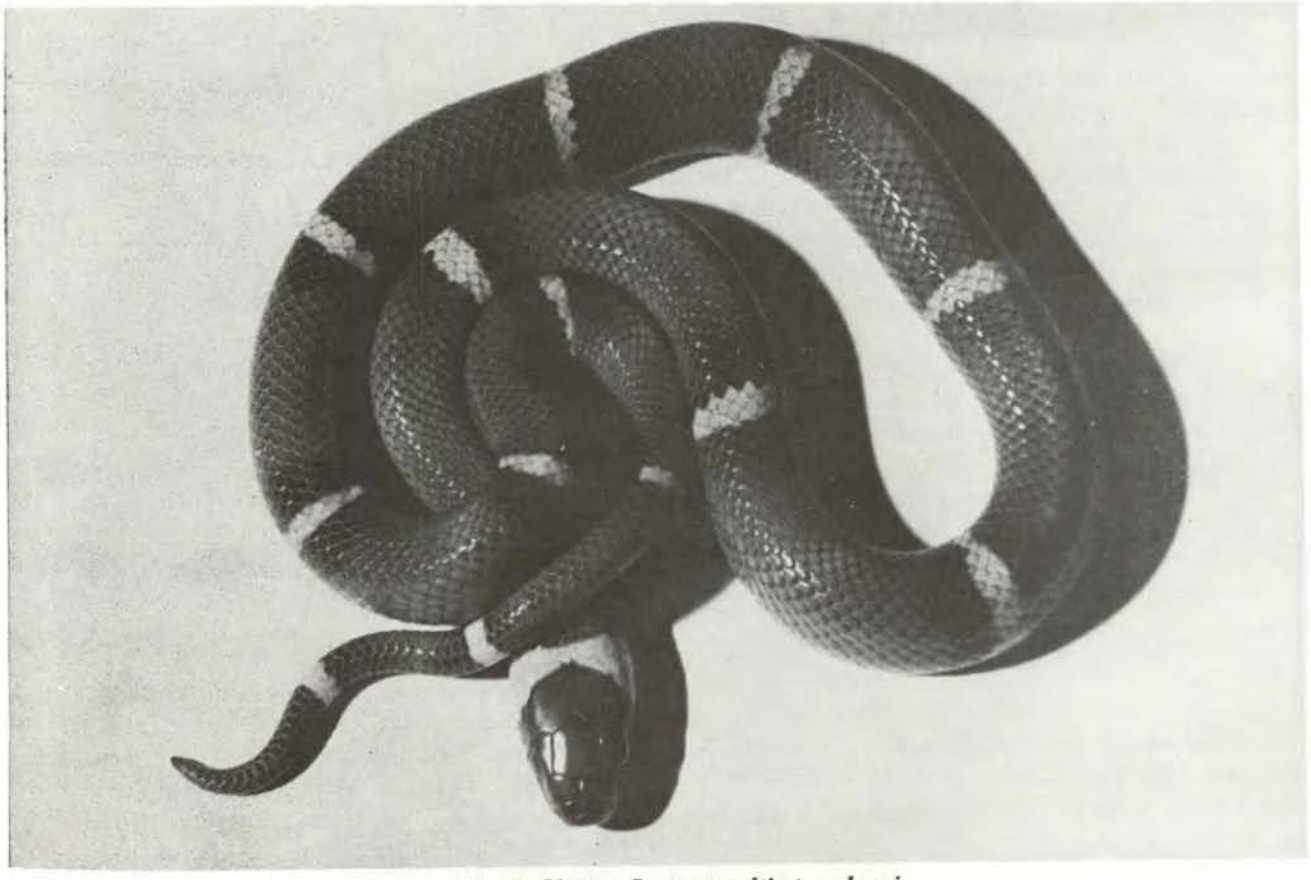


Fig. 2 Young *Lampropeltis t. nelsoni.*

NOTES ON REPRODUCTION IN CAPTIVE *LAMPROPELTIS TRIANGULUM NELSONI* (SERPENTES; COLUBRIDAE)

Information on reproduction in the polytypic species *Lampropeltis triangulum* is scant in the literature, and is mostly concerned with forms restricted to the United States. Conant (1951), and Wright and Wright (1957) reported on eggs and young of the nominate form *L. t. triangulum*; Palmer (1961) and Groves and Sachs (1973) reported on *L. t. elapsoides*, and Fitch and Fleet (1970) provided information on *L. t. syspila*. Werler (1951) mentioned eggs and young of *L. t. annulata*, a form that enters southern Texas from Mexico. Little reproductive data are available on the Mexican forms of *Lampropeltis triangulum*. The present paper gives details of successful reproduction in captive *L. t. nelsoni* for three consecutive years.

One male *L. t. nelsoni* (total length 994 mm, weight 346.8 g) received 28 August 1964 and one female (total length 840 mm, weight 163.2 g) received 16 January 1967, were placed on exhibit at the Fort Worth Zoological Park. An additional adult female (total length 834 mm, weight 164.3 g) was obtained 5 September 1973, and the trio was placed together in a two foot fiberglass cage (Hulsey, 1973) in early October 1973. Pea gravel was used as a substrate, and rocks and plastic plants were added for cage decoration and security for the snakes. Temperature fluctuated seasonally between approximately 23 and 32° C, and the relative humidity was consistently high due to cage position. Fluorescent lighting was provided about ten hours daily. Each snake fed weekly on one or two 20 g mice.

Reproductive data are given in Table 1. Although actual copulation was never observed, courtship and attempted copulation were noted on several occasions during the first two weeks in June of 1975 and 1976. It was thought that copulation occurred during the night.

Eggs were laid by the most recently received female in 1974 and 1975 and by both females in 1976. Several weeks before deposition, the snakes refused food and appeared noticeably gravid. In 1974 and 1975, damp sphagnum moss was placed in the exhibit and was used as an egg laying area. In 1976, both females were isolated individually and were provided a bowl filled with the above medium. Several days before laying, each snake coiled beneath the sphagnum and remained there until deposition had been completed. The eggs were soft, white, irregularly shaped, and moderately adherent. Length and diameter of the eggs were measured with a vernier caliper, and weighed on a triple beam balance soon after laying.

The eggs were incubated in groups of two or three in well-sealed one gallon glass jars on a medium of four or six oz. of vermiculite and an equal number of fl. oz. of water (Tryon, 1975), and maintained between 23° AND 30 ° C. Hatching occurred in approximately sixty days. After several longitudinal dorsal slits had been made, the snakes' heads protruded, and in one to twelve hours each hatchling emerged and dug under the vermiculite. Lengths were recorded within several hours after hatching using the squeeze box technique (Quinn and Jones, 1974) and weights measured on a triple beam balance.

Juvenile coloration was similar to that of the adults only much brighter, and the white bands possessed a greenish tint dorsally. Of the thirteen total juveniles, none had the same sequence of complete and broken bands, and therefore each could be easily identified.

Ecdysis occurred from seven to ten days after hatching, and all hatchlings were induced to feed shortly thereafter on new-born mice. Growth was fairly rapid. For two 1974 hatchlings retained, a male and a female, mean total length increased from 265 mm to 795 mm, and mean weight increased from 9.5 g to 138.0 g in approximately two years. Above measurements and weights for the adult snakes were taken 4 October 1976.

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Table 1. Reproductive date on *Lampropeltis triangulum nelsoni.*

YEAR	1974	1975	1976	
Date of laying	6 July	21 July	19 July	23 July
No. of eggs	4	3	4	5
No. hatch	4	3	4	2
Date of hatching	5-6 Sept.	20 Sept.	15-16 Sept.	18 Sept.
Incubation period	62-63 days	62 days	59-60 days	58 days
Mean egg length (mm) (range)	53.2 (49-60)	48.0 (47-50)	51.2 (45-57)	47.6 (45-50)
Mean egg diameter (mm) (range)	18.0 (17-20)	18.3 (18-19)	19.7 (19-20)	17.4 (15-19)
Mean egg weight (g) (range)	10.3 (9.9-11.0)	10.4	13.1 (11.0-14.9)	9.8 (7.3-12.3)
Mean total length of hatchlings (mm) (range)	267 (263-269)	272 (261-288)	291 (286-296)	278 (275-282)
Mean weight of hatchlings (g) (range)	9.2 (8.7-9.6)	8.9 (8.7-9.2)	10.8 (9.4-11.6)	10.7 (10.5-11.0)

WEST MALAYSIAN TURTLES: UTILIZATION AND CONSERVATION

INTRODUCTION

Hanging appendix-like below the belly of Asia, the Malay peninsula extends as a long, narrow backbone of a mountain range that originates in Burma and Thailand. The southern third of this peninsula, reaching to within 2° of the equator, is the mainland portion of Malaysia, West Malaysia. In this lush, tropical land exists one of the world's most diverse asemblages of turtles. Some five families, twenty genera, and twenty-three species (Table I) have been reported for this area which is slightly smaller than the state of Illinois. As in other developing countries, there is a heavy demand for these species and their products. But unlike so many other countries in this region, the value of turtles as a renewable resource is recognized in West Malaysia and efforts are being made to conserve them for future generations.

This report describes the usage of turtles in West Malaysia and reviews laws and conservation measures currently being undertaken to protect these valuable species.

THE FAUNA

The batagurine emydids, largest and most varied chelonian group in West Malaysia, comprise 48% (11/23) of the species. The members range in size from *Cuora amboinensis* and *Siebenrockiella crassicollis* which seldom attain carapace lengths of 200 mm to *Orlitia borneensis* which may approach 800 mm carapace length. In habits a few are chiefly aquatic (e.g. *Batagur baska* and *Callagur borneoensis*) but most tend to be amphibious (e.g. *Notochelys platynota, Cyclemys dentata, Heosemys grandis*. *Heosemys spinosa* seems to be the most terrestrial of the group.

Of the three testudinids reported for Malaysia, only *Geochelone emys* is at all common. They are today most numerous in hill and mountainous areas, perhaps because of human predation and development in the lowlands.

Representatives of all five genera of sea turtles occur along the coasts of West Malaysia, but inly *Dermochelys coriacea, Chelonia mydas,* and *Lepidochelys olivacea* nest in numbers; most nesting beaches occur on the east coast and associated islands. The *Dermochelys* nesting population, possibly exceeded only by one in Guiana, is one of the world's largest.

Four genera and species of trionychids have been reported from Malaysia. Three of the four (*Trionyx cartilagineus, Pelochelys bibroni* and *Chitra indica*) approach or exceed 700 mm disc length. The fourth (*Dogania subplana*) seldom reaches 250 mm. *Trionyx cartilagineus* is by far the most common and occurs in rivers, swamps, ponds and ditches throughout the country.

USAGE

Uses of turtles in West Malaysia fall into three somewhat overlapping categories: food, religious and superstitious purposes, and novelties for the tourist trade.

Certainly the chief importance of turtles to Malaysians is as food, the usage varying considerably with race and religion. Malays, who comprise over fifty percent of the population in West Malaysia, are prohibited from eating turtle (reptile) meat by the Islam faith. They can, however, eat turtle eggs which are considered a great delicacy and are said to have aphrodisiacal properties. Eggs of five species (*Dermochelys coriacea, Chelonia mydas, Lepidochelys olivacea, Batagur baska* and *Callagur borneoensis*) are common in local markets during appropriate seasons (Fig. 1). Whereas chicken eggs sell for US 4-6 cents each, *Chelonia* and *Lepidochelys* eggs cost 8-10 cents each and *Dermochelys, Batagur* and *Callagur* eggs cost 12-16 cents each. Eggs are eaten raw, soaked in brine and then boiled, or mixed with pullet (glutinous) rice.

The second largest ethnic group (37%) and the largest consumer of turtle flesh in West Malaysia is the Chinese. They eat most of the local species (excluding sea turtles) prepared in a variety of dishes. Beyond their delectability, chelonians are reputed to possess certain medicinal value. It is believed that one's kidneys, strength and virility all benefit from a properly prepared turtle dish. A jelly prepared by boiling a carapace with vinegar is used to treat fevers, debility, and acute rheumatism (Burkill, 1966). Softshells, chiefly *Trionyx cartilagineus,* are particularly esteemed for food. One delicious method of preparation is soup made from the flesh and cartilaginous portion of the shell with a variety of herbs, including ginseng. Hardshell turtles are steamed with Chinese herbs. Eggs are often eaten with wild honey.

Where religion allows, Indians also eat turtle, but comprising a small minority in the country, their impact on turtle populations is presumably light. An elderly lady told me that turtle meat steamed with Indian herbs could cure piles.

Finally the aborigines or Orang Asli (indigenous peoples of Malaya) eat turtle and are amazingly adept at finding them. Aquatic species are probed for in the mud and sand when waters are low or are speared from a prau (dugout) in clear swamps and rivers. Preparation is without frills; the plastron is opened and the intestines are removed, cleaned, salted and then replaced. The turtle is placed among the coals of an open fire until done. Turtles are considered an especially good find because they come equipped with their own cooking pot.

Although eggs are sold in markets on both coasts, turtles are common only in the west coast markets where most of the Chinese have settled. The east coast is predominately Malay. In the market in Telok Anson, a medium-sized western town, the most common species sold are *Trionyx cartilagineus* and *Cuora amboinensis* with

Siebenrockiella crassicollis and *Pelochelys bibroni* showing up occasionally. Softshells bring the best prices with young (more tender) *Trionyx cartilagineus* selling for US 80 cents per kati (1 1/3 lbs.). *Curoa* sell for 60 to 80 cents each. In addition to the market, turtles are sold in the so-called Chinese "pet shops". Here they are purchased for food, medicine, or occasionally as pets. In one large establishment I recorded the following species: *Callagur borneoensis, Cuora amboinensis, Cyclemys dentata, Geochelone emys, Heosemys grandis, H. spinosa, Notochelys platynota, Orlitia borneensis, Pelochelys bibroni, Siebenrockiella crassicollis,* and *Trionyx cartilagineus.*

Other than food, turtles have a certain religious significance to Chinese Buddhists and a number of turtle temples are scattered throughout Malaysia. According to popular belief, one finding a turtle and delivering it to one of these temples has saved a life and will be rewarded with good fortune and long life. In some temples, turtles are given no care but in others, where they have become a tourist attraction, vegetable greens are sold for visitors to feed the turtles.

Two of the most attractive and striking turtle temples are the Kek Lok Si Temple in Penang (Fig. 2 & 3) and Sam Poh Thong Temple in Ipoh. The former sits high on a hill overlooking the city of George Town. The latter is built into a cliff and sheer rock walls surround the turtle pool and garden on all sides. Within both temples one can see *Batagur baska, Callagur borneoensis, Cuora amboinensis, Heosemys grandis, Orlitia borneensis, Siebenrockiella crassicollis,* and even *Pseudemys scripta elegans* (a common US turtle sold in Malaysian pet shops). Several *Geochelone emys* were observed around the edge of the pool at Penang. *Heosemys grandis* was most common in both temples.

Easily the largest tourist activity related to chelonians is "turtle watching" which has created a sizeable industry on the east coast in recent years. During the sea turtle nesting season (May to September) thousands of tourists converge on the various nesting beaches, a practice being increasingly promoted in travel brochures. A number of motels cater to the "turtle watchers" and local entrepreneurs profit by selling food, drink, and protection for parked cars. Further it is not unusual to be walking down a seemingly deserted stretch of beach only to have someone dart out of the shadows to sell "turtle watching" tickets.

The most popular turtle watching area is a half mile stretch of beach at Rantau Abang, Trengganu, where the Department of Fisheries operates a hatchery and nesting sanctuary for the giant leatherback, *Dermochelys coriacea.* Here a series of small open coffee shops have been constructed where tourists can await the turtles which often do not emerge until 2:00 or 3:00 a.m. Unfortunately, these shops have greatly proliferated recently and their lights are becoming a problem, discouraging the shy leatherbacks from using the government's beach. Crowds are also becoming a problem; it is not unusual for a leatherback to lay its eggs while encircled by several hundred observers. One night in 1975 an estimated 4000 observers swarmed the nesting beach. Emerging turtles could find no open sand and eventually returned to water.

Fortunately, turtles have not become a big tourist souvenir item. Only *Eretmochelys imbricata* has joined the gaudy, stuffed, shellacked false gharials, crocodiles, monitor lizards, and cobra-mongoose displays in tourist shops of Singapore and Kuala Lumpur. Some tortoise shell (*Eretmochelys*) is also sold in various forms of jewelry. For the most part these hawksbill products come from Indonesia rather than local sources. I have seen no evidence that the reptile leather business is using turtle hides. Crocodilians, monitor lizards, and pythons are most commonly sold for this purpose.

LEGISLATION AND CONSERVATION

Malaysia is a conservation leader in SE Asia. This circumstance is partly because of the country's relatively high standard of living, partly due to enlightened leadership in those government agencies responsible for the nation's resources, and partly to a small but active band of conservationists. Spearheading many conservation efforts is the Malayan Nature Society, presently approaching one thousand members. The Society publishes THE MALAY NATURE JOURNAL for scientific publication and THE MALAYAN NATURALIST, a quarterly newsletter which covers recent conservation events and serves as a forum for members' conservation ideas. Beyond this the Society operates a speakers' bureau for schools and organizations, holds essay and art contests on conservation subjects, and generally publicizes conservation throughout the country.

Among its recent activities are several turtle-related projects. The Society is working with the Tourist Development Corporation to insure that increased tourist visitation and facilities at leathery turtle nesting beaches cause minimal disturbance to the turtles. On the west coast the Society is working to establish sanctuaries for *Chelonia mydas* and *Lepidochelys olivacea* on the tourist islands of Pangkor and Penang and a sanctuary for *Eretmochelkys imbricata* in the state of Malacca.

Two government agencies divide responsibility for turtles. Fresh water and terrestrial species fall under Game Department jurisdiction whereas salt water species are under control of the Department of Fisheries. These agencies enforce existing laws and set up government sponsored conservation programs.

Unfortunately, protection of declining species is hampered by a scarcity of existing laws. Only two of eleven states presently have laws controlling exploitation of inland turtles. In the state of Perak, two laws passed in

1915 offer protection to the genera *Orlitia, Batagur, Callagur,* and *Hardella.* Interestingly, the latter does not occur in Malaysia. Basic provisions of the laws prohibit certain types of traps in the nesting area at times when hatchlings are emerging, prohibit the killing of these genera on the lower Perak River, and give the state authority to license and lease egg-collecting areas. In 1972 the state of Kedah passed a similar law for licensing and leasing *Batagur* egg-collecting areas.

Four out of eleven states (Perak, Kelantan, Trengganu, and Pahang) have laws applying to sea turtles but the major emphasis is on licensing and leasing egg-collecting areas. Adults are given protection but egg-collecting is not restricted and thus almost all eggs laid are collected and sold.

To gain uniformity in turtle legislation throughout West Malaysia, a new law has been written that applies to *Batagur baska, Dermochelys coriacea, Chelonia mydas, Lepidochelys olivacea* and *Eretmochelys imbricata.* The new legislation transfers the authority and responsibility for turtle protection from the state to the Department of Fisheries (federal), providing more power and wider coverage over turtle management. Specific tenets of the bill provide for regulation of egg collection, killing and possession of turtles, tourist "turtle watching", cruelty to turtles, conservation programs and collection of statistics on nesting. The greatest obstacle in passing such sweeping legislation is that wildlife exploitation is the prerogative of each state and no federal law can be passed controlling this resource. Therefore each state assembly must pass the law separately for it to be accepted countrywide and whether all states will approve this new law remains to be seen.

Despite the inadequacy of existing laws, both Game and Fisheries Departments have begun active conservation efforts for endangered species. The Game Department in 1967, under the leadership of the present Chief Game Warden, Mohamed Khan, an avid conservationist and current president of the Malayan Nature Society, established a hatchery program for *Batagur baska* on the Perak River. Eggs are purchased from local licensed collectors and hatched in sand on an artificial beach. Hatchlings are then raised in captivity for one year and released on the natural nesting beaches. To date 6,000 to 7,000 *Batagur* have been returned to the Perak River as part of this program. The program is an important step in halting the decline of *Batagur* populations but a number of programs remain to be worked out. Low hatching success and the advisability of raising hatchlings in captivity are two problems under current study. Next year the *Batagur* program will be expanded with the establishment of a hatchery on the east coast's Trengganu River.

The Department of Fisheries currently operates a hatchery for *Dermochelys coriacea* in the state of Trengganu. The history of this project has recently been reviewed (Kiew, 1975). Briefly, the program was initiated by the Department of Fisheries and the Malayan Nature Society under the advisement of Dr. J.R. Hendrickson in 1961. The state of Trengganu financed the original project which produced 3,699 hatchlings from 8,366 eggs. With additional financial aid from the World Wildlife Fund, Fauna Preservation Society, and the Malaysian Government, the number of hatchlings released has grown steadily to 42,616 from 91,147 eggs in 1974. From 1961-1974, 244,392 hatchlings have been released. The present goal is to obtain 15% (ca. 180,000) of all eggs laid each year for the hatchery.

The Director of the Fisheries Department in Trengganu, Siow Kuan Tow, presently oversees the *Dermochelys* program. An active, imaginative biologist and administrator, Mr. Siow has grandiose plans for the sea turtle hatchery on Malaysia's east coast. Examples of future improvements that Mr. Siow would like to add to the program include: 1) fencing off five of the twelve miles of the *Dermochelys* nesting beach as a turtle sanctuary; 2) beginning similar hatchery programs for *Chelonia mydas* and *Lepidochelys olivacea*; and 3) establishing a green turtle ranch in a fenced-off natural pasture.

CONCLUSION

The future for chelonians in Malaysia looks brighter than in other parts of SE Asia, but there are still many problems which need attention. Considering the large numbers of turtles sold in markets and exported to Singapore for consumption each year, certain populations must be rapidly dwindling. Population studies are sorely needed to provide the base-line data necessary to assess which species are being over-exploited. At present those species nesting in mass on specific areas (i.e., *Batagur, Callagur,* sea turtles) seem most threatened, although the great demand for softshell meat requires that these species be watched closely as well.

Hopefully Malaysia's excellent beginning in turtle conservation will be continued and expanded to set an example for other nations in the area.

ACKNOWLEDGMENTS

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Table I. Chelonians of West Malaysia

CHELONIIDAE
- *Caretta caretta**
- *Chelonia mydas*
- *Eretmochelys imbricata*
- *Lepidochelys olivacea*

DERMOCHELYIDAE
- *Dermochelys coriacea*

EMYDIDAE
- *Batagur baska*
- *Callagur borneoensis*
- *Cuora amboinensis*
- *Cuora trifasciata**
- *Cyclemys dentata*
- *Geoemyda spengleri**
- *Heosemys spinosa*
- *Heosemys grandis*
- *Hieremys annandali***
- *Malayemys subtrijuga***
- *Notochelys platynota*
- *Orlitia borneensis*
- *Siebenrockiella crassicollis*

TESTUDINIDAE
- *Geochelone elongata**
- *Geochelone emys*
- *Geochelone impressa*

TRIONYCHIDAE
- *Chitra indica**
- *Dogania subplana*
- *Pelochelys bibroni*
- *Trionyx cartilagineus*

* Based on reports in literature but I have not seen Malaysian specimens.

** Known from Malay Peninsula; occurrence in West Malaysia needs subtantiation.



Fig. 1. Sea turtle eggs on sale in market at Kuala Trengganu, Malaysia.

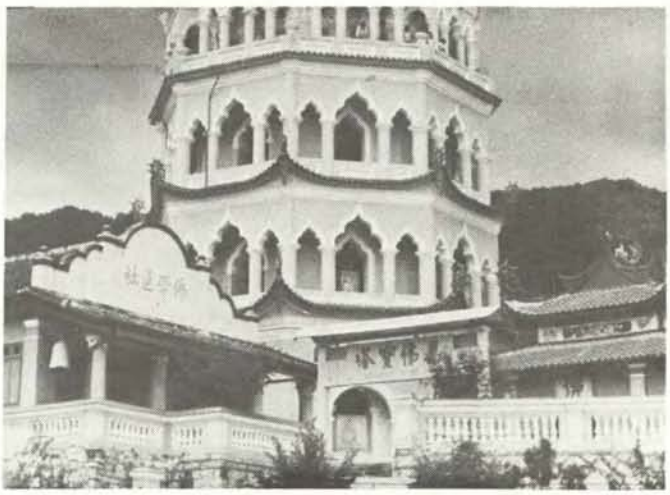


Fig. 2. Kek Lok Si Temple, a "turtle temple" on Penang Island, Malaysia.



Fig. 3. Turtles "begging" for food in main pool at Kek Lok Si Temple.

WORM SMAKES IN THE DIET OF A TOAD, *BUFO MELANOSTICTUS*

Campbell and Davis (Herpetologica, 1968, 24(4):327-328) summarized the literature dealing with stomach contents of field collected toads of the genus *Bufo*. They also reported the first vertebrates in the diet of any member of the genus *Bufo*; *Sceloporus undulatus* and a juvenile *Bufo woodhousei* having been ingested by *Bufo valliceps*.

On 15 June 1975 while in Lundu, 1st Division, Sarawak, Malaysia, I collected 10 adult *Bufo melanostictus*, one of which disgorged a dead *Typhlina bramina* while being preserved. Later dissection of the other 9 preserved toads revealed 3 additional *T. bramina* in the stomach contents. None of the worm snakes showed much damage as a result of being ingested.

Checking the stomachs of the relatively easily collected, larger species of toads may prove to be a valuable source of much scarcer species of sympatric worm snakes.

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GRANTS AVAILABLE FROM THE SAVANNAH RIVER ECOLOGY LABORATORY

The Savannah River Ecology Laboratory (SREL) of the University of Georgia is making available grants to eligible faculty and post-doctoral investigators (monthly salary up to $1,200 plus an additional $75/month when accompanied by dependents), for eligible graduate students (annual stipends of $3,000-3,600, plus tuition and fees and limited travel allowance) and, during the summer, eligible undergraduates (stipends of $90/week). Research areas of SREL resident faculty include bioenergetics, behavioral ecology, physiological ecology, population dynamics, community ecology, and herpetology.

For application materials and additional information, write to: Dr. Rebecca R. Sharitz, Faculty (Graduate, Undergraduate) Research Program, Savannah River Ecology Laboratory, Drawer E, Aiken, South Carolina 29801. The deadline for the receipt of all application material for the summer program is January 10, 1977. Appointments are announced in April.

AN UNUSUAL BASISPHENOID IN ONE SPECIMEN OF *GRAPTEMYS FLAVIMACULATA*

Skeletons of 18 specimens of *Graptemys flavimaculata* (TU# 15124, 15128, 15132, 15374, 15377, 15405, 15735, 15737, 15738, 15747, 15748, 15761, 15784, 15786, 15787, 15789, 15790, and 15791), collected from the Pascagoula River, Mississippi, and deposited in the Tulane University Museum of Natural History, were analyzed using a Bausch and Lomb dissecting microscope. From a palatal view, the basisphenoids of 17 of these specimens were observed to be unpaired, triangular elements, which project anteromedially between the pterygoids along three-fourths of their length. The base of this triangular element is oriented posteriorly, where it abuts the basioccipital by a crescent-shaped suture. Thus, the basisphenoid of these specimens is similar to that of most fossil and recent turtles. However, in one specimen (TU 15132), the basisphenoid was split into a distinct anterior and posterior portion, of approximately equal length, by a transversely oriented crescent-shaped suture. The division between these elements is not the result of injury to this bone, but apparently represents a normal sutural contact between two elements (Fig. 1).

Kunkel (1912) and Shaner (1926) reported that the basisphenoid of *Emys* and *Chrysemys* arises from two centers. The cartilage bone basisphenoid proper then fuses with the membrane bone parasphenoid, which lies anterior to the basisphenoid and beneath the hypophysis, during development. Thus, the "basisphenoid", found in this one specimen of *Graptemys flavimaculata*, probably represents a lack of fusion of these two elements during the development of this specimen. The anterior portion of this element would represent the parasphenoid of other reptiles, and the posterior portion would represent the basisphenoid proper, a condition previously unreported for turtles.

The presence of an unfused basisphenoid-parasphenoid is interesting for several reasons. First, the skeleton, which is often useful for taxonomic purposes, is generally considered to be relatively conservative, with respect to variability, as compared to various features of the soft anatomy. This is especially true for turtles which have remained relatively unchanged for millions of years (Romer, 1956). Variations in size, shape, or topography of various elements are relatively common in comparison to those involving addition, deletion, or incomplete development of skeletal elements, since most of the latter types of variability are often deleterious. Thus, the occurrence of an unfused basisphenoid-parasphenoid represents an abnormal variation in a normally conservative taxonomic character. This is especially significant in the case of *Graptemys flavimaculata* since the morphology of the basisphenoid has been found to vary interspecifically between *Graptemys flavimaculata* and *Graptemys nigrinoda* (Killebrew, 1976).

Secondly, the occurrence of an unfused basisphenoid-parasphenoid is significant from a developmental standpoint. Fusion of these elements during development is undoubtedly a genetically controlled phenomenon. Thus, lack of fusion of these elements must represent either an alteration of genetic information or a breakdown of normal developmental processes, without consequent deleterious effects on the animal.

The occurrence of an unfused basisphenoid-parasphenoid is also significant from the standpoint of the phylogenetic history of the group. In most primitive reptiles, including the supposed ancestors of the turtles, the cotylosaurs, a distinct parasphenoid and basisphenoid are present. However, these elements are fused in even the most primitive turtles that are now known to have existed (Romer, 1956). Thus, it is interesting that a character, not known to occur in any fossil or recent turtle, but one which was present in the ancestors of turtles, should appear in a present-day individual because of some genetic or developmental abnormality.

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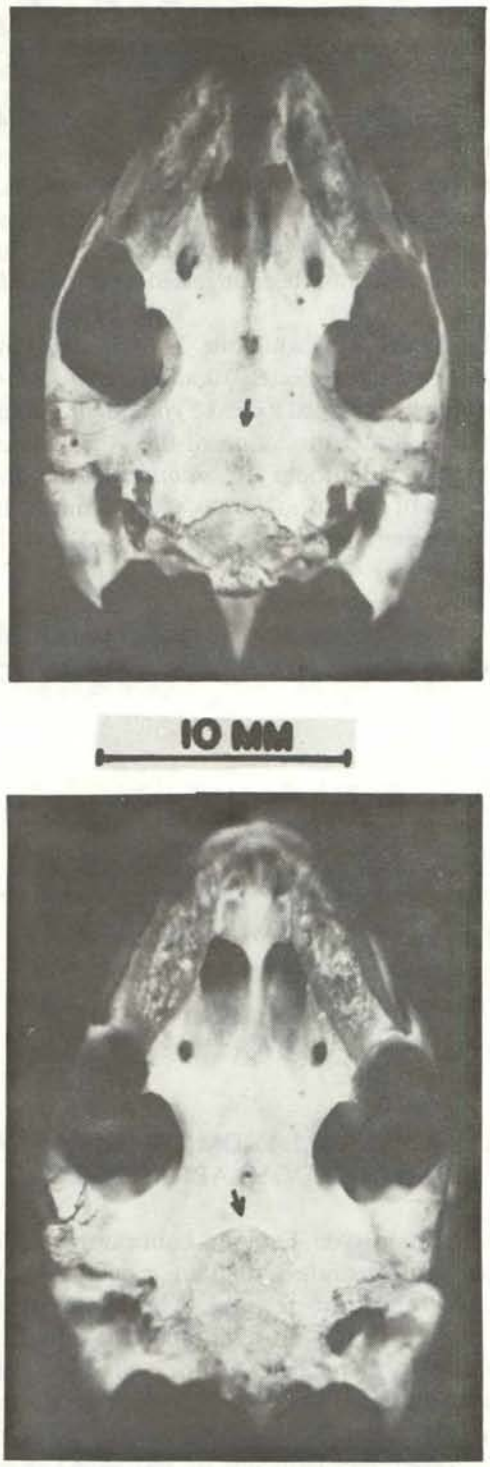


Fig. 1. A comparison of the normal (A) (TU 15738) and a "split" (B) (TU 15132) basisphenoid in *Graptemys flavimaculata*. Arrows indicate the basisphenoid element in each skull.

SKELETAL PREPARATION OF HERPETOLOGICAL SPECIMENS

The preparation of skeletons of small animals is of importance in a variety of disciplines. For fundamental taxonomic work it is essential to have perfectly clean preparations in which all small bones and delicate bone spurs and processes as well as cartilaginous connections remain intact. For studies on the morphologic basis of behavior (e.g. locomotion) it may be important to preserve the articulated integrity of appendicular elements such as the shoulder or pelvic girdles. In preparations destined for museum display or other artistic purposes, the physical appearance of the skeletal material may be of paramount interest. During our work at the Museum of Comparative Zoology, Harvard University, we have employed a method of preparation which achieves satisfactory results in each of these areas.

MATERIALS

1) Specimens - animals preserved in alcohol work best, but freshly killed specimens can also be used.

2) Clorox (5.25% sodium hypochlorite) - a strong acid or base can be used, but Clorox is most easily obtained.

3) Ethyl alcohol, 75% - acts as a weak base to neutralize the acidic Clorox.

4) Dissection instruments - forceps, scalpel and razor blades are the most useful. A fine and a coarse pair of forceps are necessary, and the scalpel must be sharp.

5) Anatomy book, reference skeleton, or other guide, for anticipating the structures to be encountered while dissecting.

METHOD

Preparing the specimen. The sex, relevant lengths, scale counts and other important character states should be recorded if needed. Slit the skin on the ventral surface of the limbs and in the throat region, and then peel off the skin from the entire body using forceps. Do not slit the skin on the chest as this may injure the cartilaginous structures of the sternum. The skin around the mouth can be slit at the gumline to facilitate removal of the head skin in one piece. The latter procedure allows retention of the scale characters of taxonomic importance. The empty skin should be tagged and retained. The skin of the head remains attached to the body if only a skull will be prepared.

When the skin has been removed use the scalpel and forceps to carefully cut and eliminate muscle and connective tissue from the bones and joints. Spare all cartilage, but remove soft tissue organs. Removal of the eyes is most easily accomplished by a snip with fine scissors. Remove the brain if possible by entering the foramen magnum with a fine hook or through the orbits with fine forceps. Be careful not to scrape the skull roof or any bones. Retain the hyobranchial skeleton, either dry or in alcohol. Note the presence of calcified endolymphatics. These structures should be kept intact, although the precise arrangement is up to the discretion of the researcher: skull (lower jaw may or may not be disarticulated); shoulder girdle; pelvic girdle; vertebral column.

The Clorox treatment. Place the animal in Clorox and observe it *closely*. This step is critical in that if the bones sit too long in the Clorox they will eventually become powdery and fall apart when dry. Cartilage is a good indicator for determining when the skeleton has been in the Clorox for the proper amount of time. When the cartilage starts to disintegrate (usually in 1-4 min) the skeleton must be removed and immediately placed in 75% ethyl alcohol. If the cartilage is allowed to completely disintegrate the bones will have become too deeply penetrated by the Clorox, and the alcohol immersion will not neutralize all the Clorox. This will cause the skeleton to progressively disintegrate over the coming months and years. The immersion times in Clorox and alcohol are size determined, with larger specimens requiring more time. If no cartilage is present as an indicator in the piece being skeletonized, a time limit of 2 min (or less) should be placed on the Clorox treatment. It may be necessary to follow the progress of some small structures under a dissecting microscope.

After the immersion in alcohol (3-5 min) continue by picking off the muscle and other connective tissues remaining on the bones. Sometimes repeated immersions in Clorox may be necessary to achieve a clean skeleton. These reimmersions should not exceed 1 min in length per reimmersion. A moistened cloth, medicine dropper or syringe full of Clorox may be used for problem spots in cases where total reimmersion is not desired. When the skeleton is adequately cleaned, let it sit in alcohol for 15-20 min, then let it dry. When skeletonizing a large amount of material it will be necessary to replace both the Clorox and alcohol when they lose their effectiveness. The Clorox can be seen to be ineffective when a new bone placed in it fails to become covered by small fizzling bubbles. The alcohol need not be changed as often as the Clorox.

Special considerations for frogs. When preparing a frog skull it is best to leave the anterior palate tissue attached and to not disarticulate the lower jaw. Frog digits should be left in the skin. Do not disarticulate the limbs at the wrist or ankle, unless one set of limbs is disarticulated and not the other.

Special considerations for turtles. Turtles may be prepared by leaving the shell whole, or by sawing across both bone bridges of the plastron. The whole shell may be prettier, but it will be much harder to work with. When sawing off the plastron, some shell is lost so that the two pieces cannot be fitted together exactly. Turtles of the suborder

Pleurodira (side-neck turtles) have the pelvic girdle connected to both carapace and plastron, so that when removing the plastron, the girdle element may be broken accidentally.

Working with a scalpel around the forelimbs and head region, the skin can be detached from the shell where they meet. Next the two front legs are removed taking care to detach all girdle elements. The neck is then snapped off to the eighth cervical vertebra. The same procedure can be used at the hind end, but it is all made easier if the plastron has been removed. If only the skull is wanted, the skin should be removed in such a manner that it remains attached to the body. This is best achieved by making two lateral incisions along the neck to the angles of the mouth and then freeing the two resulting flaps in the mid-neck region and working forward to free them from the skull itself.

Do not soak the outside of the carapace in Clorox; however, the inside of the carapace can be cleaned by pouring Clorox into it like a bowl. In case removal of the scutes is desired, they will either peel off easily, or in most cases come off with a chisel.

STORAGE

The completed skeletons are labeled and stored in cardboard boxes or in transparent plastic boxes. The latter allow the skeleton and its inside label to be clearly viewed without opening the box. Large pieces such as turtle shells may be put into plastic bags.

MISCELLANEOUS

Do not leave anything in Clorox for more than 10-15 min, for the results will be disastrous. Count on one half to one hour for the skeletonizing procedure, or much longer for medium to large-sized specimens. Gloves are cumbersome unless they are tight-fitting surgical gloves.

Skeletonization by dermestid beetles is a preferred method for unpreserved specimens, especially if only larger bones are involved. Preserved material may not be eaten by dermestid beetles and the Clorox method works extremely well. If an alcoholic specimen has dried out, it can be skeletonized, but it must be soaked in alcohol for a few days beforehand.

The main potential problem with the Clorox procedure is that if the Clorox immersion is too long then the skeleton becomes powdery and falls apart after some time. Using the method outlined above avoids that problem, and skeletons we have prepared are still in a perfect state after nearly five years.

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COLOR PRESERVATION IN SALAMANDERS

Formalin fixation and alcohol storage have been the routine methods of choice for the preservation of amphibians and reptiles for museum collections. Although this method preserves vertebrate specimens very well over a period of many years, it has the disadvantage of bleaching some colors and darkening others, making identification of the organisms more difficult.

Several methods for the preservation of color in whole vertebrate specimens have been proposed. The use of ammonium sulfate (Windsor, 1971) and ascorbic acid with Prague powder [1] (Humason, 1967:515) as the active ingredients have been recommended, but the colors ultimately fade unless the specimens are kept in the dark. Noticeable fading occurs within the first month if they are exposed to light.

I have found that a paraformaldehyde-glutaraldehyde mixture at a pH of 7.0 to 7.1 will preserve the colors of the salamanders even though after fixation, they have been exposed to light (Sylvania "Lifeline"® fluorescent lights) for an average of 12 hours per day for eleven months.

Proposed Method. The fixative formula is basically that of Karnovsky (1965) for the preservation of tissues for electron microscopy, but modified to avoid shrinkage of the specimens.

Forty grams of paraformaldehyde powder are dissolved with constant stirring in 500 ml of distilled water at 65° C. The solution is then cleared with a few drops of 1 N NaOHwith constant stirring (the solution need not clear completely). Then add 100 ml of 50% glutaraldehyde and bring the volume up to 1000 ml with a sodium phosphate buffer (Hyat, 1970:342) adjusted to a pH of 7.1 to 7.2. The final pH should be 7.0 to 7.1.

This should be kept as a stock solution in a refrigerator for no more than a week because in solution the glutaraldehyde tends to polymerize. To use, the stock solution must be diluted to 60% by volume with distilled water. Whole specimens should be fixed for 24 to 48 hours (although one week will do no harm and it is especially recommended for reptiles). Inject all specimens with the solution to insure more even penetration of the glutaraldehyde. After fixation the specimens should be rinsed in running tap water for an hour and postfixed and stored in 60% ethanol (for reptiles use 70-75% ethanol).

Specimens of *Pseudotriton ruber, Hemidactylium scutatum, Plethodon glutinosus, Plethodon cinereus,* and *Notophthalmus viridescens* were preserved in our laboratory using the above method under the light conditions stated above and in eleven months have not shown any appreciable color loss.

Although all fixatives are toxic, special care must be given when handling the paraformaldehyde powder and the glutaraldehyde. The powder must not get into the air or irritation of the eyes and mucosal linings will occur; neither glutaraldehyde nor paraformaldehyde should come into contact with the skin. After rinsing in tap water and storage in alcohol the specimens are as handleable and pliable as those done by routine formalin fixation. Because glutaraldehyde will always leave trace amounts that cannot be washed away, a set of mixing and storing vessels should be used for this fixation method exclusively.

[1] Prague powder: Available from Griffith Laboratories, Chicago, Ill.

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LATE SEASON HATCHING SUCCESS OF *ELAPHE O. OBSOLETA*

A clutch of 27 black rat snake eggs was discovered on 20 October 1974, near Valley Park, St. Louis Co., Mo., U.S.A. The eggs were within the interior of a fallen log measuring 1.8 m in length by 0.45 m in diameter. The outer zone (5 cm thick) of the log was a shell of hard wood and the eggs were located within the inner zone which was composed of rotted wood. The nest site was in an oak forest, 5 m from the edge, on a northern hillside.

Two young snakes were hatching when the nest was first discovered. One completed hatching and escaped. The eggs were then recovered nd revisited 25 October. Present were two empty eggs, two partially hatched but inactive young and 23 unhatched eggs. Four of the latter measured: 4.5 x 3.6 cm; 4.9 x 3.4 cm; 4.1 x 3.3 cm and 4.7 x 3.6 cm. The hatching young and two eggs were returned to the laboratory and kept at 27° C to see if they were still alive. After eight days all four were determined dead. All eggs contained well developed snakes; one measured 26.5 cm SVL.

Minimal air temperatures recorded between 15 - 24 October at nearby Webster Groves, Mo. ranged from 0-10° C. Freezing was recorded only on 21 October. Evidently, low temperatures killed most snakes before they hatched.

The data of hatching of this clutch appear to be the latest noted in the literature. Wright & Wright (1957) recorded hatching dates from late August until 2 October. Fitch (1963) found a group of recently hatched young in Kansas in the second week of October.

LITERATURE CITED

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Wright, A.H. and A.A. Wright. 1957. Handbook of snakes of the United States and Canada. Comstock Publishing Associates, Cornell University Press, Volume 1, pp. 1-564.

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BUFO DAPSILIS MYERS AND CARVALHO, SECOND KNOWN SPECIMEN AND NEW TO PERU.

Bufo dapsilis was described by Myers and Carvalho (1945) on the basis of a single adult female from Bom Jardim, near Benjamin Constant, mouth of Rio Javary, Amazonas, Brasil. During the course of an investigation on the ecology of the reptilian fauna of the Upper Amazon, Iquitos Region, Peru (Dixon and Soini, 1975) one specimen of *B. dapsilis* (fig. 1) was found by Pekka Soini in the forest floor leaf litter near the village of Centro Union, near the east bank of the Amazon, Loreto, Peru, on 16-30 December 1972. This specimen (TCWC 42509) is a female with eggs and, though smaller than the holotype, is very similar to the latter. However, there are some minor differences. Myers and Carvalho (1945:14) state that the skin covering the cranium is loose and not ossified to the head and the bony ridges making up the cranial crests are soft, fleshy and not composed of bone. My specimen has the skin ossified to the skull and the cranial ridges are composed of bone. It would be highly unusual for any species of *Bufo* to have non-bony crests. I suggest that the cranium of the holotype may have been in a state of decalcification and, seemingly, without bony crests.

The color markings, condition of dorsal tubercles, shape of body, limbs and feet, size and condition of paratoid and associated body ridges of my specimen are very similar to those described for the holotype. A comparison of pertinent measurements are given in Table 1.

Table 1. Measurements of holotype of *B. dapsilis* (from original description) compared to those of TCWC 42509 (in mm.).

	Holotype	TCWC 42509
Snout-vent length	77	57.0
Head width	27	19.0
Head length	21	21.4
Head width at eyes	11	8.2
Hind limb length (anus to knee)	32	28.7
Hind limb length (knee to heel)	31	28.0
Foot length (heel to toe tip)	43	36.6
Eye diameter	8	6.0
Eye-nostril distance	6	5.0
Interorbital width	11	7.4
Internarial width	4	2.0
Vertical diameter of tympanum	5	4.7
Mandible length (rictus to symphysis)	20	15.4

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Dixon, J. R. and P. Soini. 1975. The reptiles of the upper Amazon Basin, Iquitos Region, Peru I. Lizards and Amphisbaenians. Milwaukee Pub. Mus., Contr. Biol. & Geol. 4:1-58.

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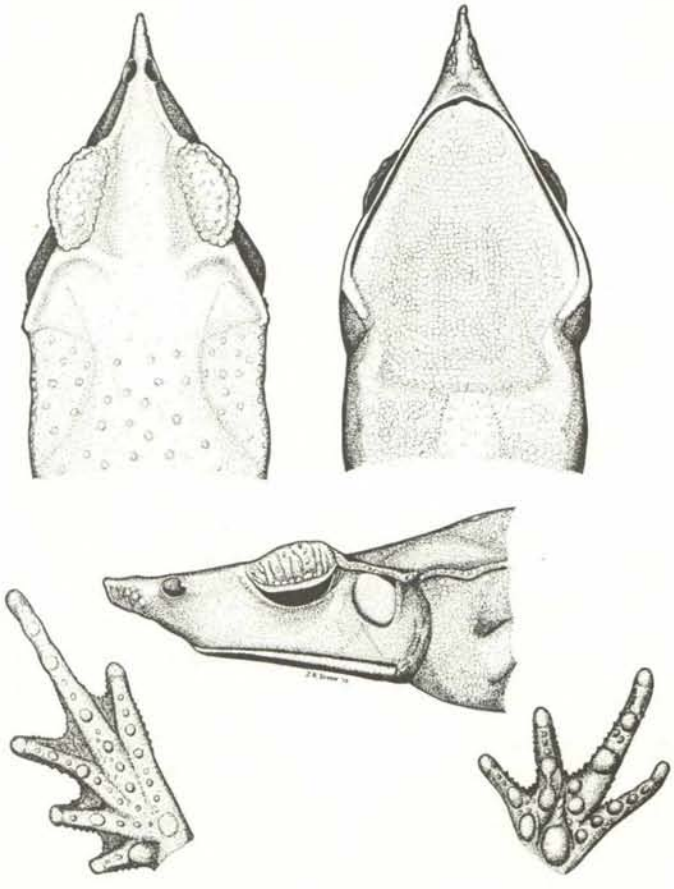


Fig. 1. Dorsal, ventral and lateral view of the head; ventral view of the foot and hand of *Bufo dapsilis* (TCWC 42509).

LEPIDODACTYLUS LUGUBRIS (REPTILIA: GEKKONIDAE): A RECENT ADDITION TO THE HERPETOFAUNA OF NICARAGUA

Lepidodactylus lugubris Dumeril and Bibron, is a common house gecko of the western Pacific east to Hawaii; it has also been recorded in the Neotropical region from the mainland in Panama (Smith and Grant, 1961), Colombia, Ecuador and Brazil (Peters and Donoso-Barros, 1970).

On 13-14 February 1976 two of us (RWH, JV) observed and collected *L. lugubris* at night in the open corridors of a hotel in Bluefields, Depto. Zelaya, Nicaragua and observed it on other buildings in the town. The lizards were active on the walls in the dimly lit corridors. They tended to stay close to the ceiling and would usually dash into spaces between the wall and ceiling to escape. The collected specimens are now in the herpetological collection of the Milwaukee Public Museum (MPM 12641-43) and Villa's private collection.

On 15-19 February 1976 we observed and collected *L. lugubris* on Great Corn Island, Depto. Zelaya, Nicaragua (65 km off the Caribbean coast of southeastern Nicaragua). The geckos were observed at night catching insects on the outside wall of a building near a shrimp packing plant. Several of the lizards were collected and are in Villa's private collection.

Lepidodactylus lugubris is common throughout much of its range. Smith and Grant (1961) suggested that their specimen from the Canal Zone arrived from Hawaii and mentioned the species' "known stowaway proclivities." Our records are the first from Caribbean Central America and it is plausible the species arrived in Nicaragua aboard a ship that passed through the Panama Canal. As boats pass daily between Bluefields and Great Corn Island, the presence of *L. lugubris* at both localities is not unexpected.

At Bluefields *L. lugubris* was abundant in several edificarian situations and at Great Corn Island only one very localized population was observed; thus it seems probable that Bluefields was colonized before Corn Island. In 1966 and 1969 one of us (JV), on visits to both localities, did not find it. This would suggest that *L. lugubris* is a rather recent colonizer of Caribbean Nicaragua.

ACKNOWLEDGMENTS. - We thank H. Marx of the Field Museum of Natural History for the loan of comparative material and H.S. Fitch for comments on the manuscript. The first author thanks the Banco Central of Nicaragua for support of his field work.

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Smith, H.M. and C. Grant. 1961. The mourning gecko in the Americas. Herpetologica 17(1):68.

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THE THEODORE ROOSEVELT MEMORIAL FUND

The Theodore Roosevelt Memorial Fund provides financial assistance to individuals (especially graduate students and persons with recent graduate degrees) conducting research in North America in any phase of wildlife conservation or natural history related to the activities of the American Museum of Natural History. Grants are usually kept to small sums of not more than several hundred dollars. Most awards support field work, and funds are not made available for salaries or for the purchase of non-expendable equipment. Address requests for application forms and all correspondence to:

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New York, New York 10024

Deadline for application is 15 February.

The Environmental Biology Program at Southern Methodist University announces summer field courses at Taos, New Mexico 13 June - 15 July and 18 July - 19 August, 1977. Courses will include Herpetology, Mammalogy, Ecology (general), Genetics and Evolutionary Biology, Community Ecology, Aquatic Ecology, Plant Ecology, Field Botany, and Plant Kingdom. For information, write to Kirkland L. Jones, Department of Biology, Southern Methodist University, Dallas, Texas 75275.

HERPETOLOGISTS, AMPHIBIANS, AND REPTILES AND THE ENDANGERED SPECIES ACT OF 1973

Within the last few years, there has been increasing interest among herpetologists in the conservation of potentially endangered and threatened amphibians and reptiles. With the publication of "Endangered and Threatened Amphibians and Reptiles in the United States" by the Society for the Study of Amphibians and Reptiles, herpetologists can now responsibly judge the merits of proposed research projects and specimen collecting trips in light of the status of any state's herpetofauna as judged by those most familiar with it. On the national level, the Office of Endangered Species, U.S. Fish and Wildlife Service, under the mandate given by the Endangered Species Act of 1973, has compiled a list of Endangered and Threatened wildlife and plants. the purpose of this law is to not only identify native and foreign wildlife and plants that qualify under its provisions, but also to provide protection to the organisms and ecosystems on which they depend. The purpose of this paper is to briefly outline the Endangered Species Act's highlights, to explain the process whereby a species is determined to be either Endangered or Threatened, and to instruct herpetologists in how they may assist the Office of Endangered Species in the determination process as it relates to the protection of amphibians and reptiles.

The Endangered Species Act of 1973

The Endangered Species Act of 1973 (Title 16, U.S. Code, Sections 1531-1543) attempts to provide means whereby Endangered and Threatened species of wildlife and plants, and the habitat necessary to their survival, may be preserved. The Act does this in three principal ways: 1) by the prevention or strict regulation of collecting and trading of Endangered or Threatened species, 2) by providing means for protection of species' habitat, and 3) by insuring that the United States complies with international agreements to which it is a party. To accomplish these goals, lists of Endangered and Threatened wildlife and plants are compiled by the Office of Endangered Species. The Act also provides means to set aside habitat for these species, either through direct Federal purchase or by authorizing funds to individual states for conservation of endangered or Threatened species within their jurisdiction. In addition, all Federal agencies must insure that their activities will not harm species determined to be Endangered or Threatened. On an international level, the Act allows the U.S. government to assist foreign governments in conserving their Endangered and Threatened species. Prohibitions are set forth for the collecting and commercial use of Endangered and Threatened species and their products, and penalties are prescribed for violation of the Act. Penalties may be severe; if the Act is knowingly violated, fines of up to $20,000 and imprisonment of up to one year may be imposed for criminal acts. In addition, a reward of up to half of the civil penalty or fine paid (not to exceed $2500) may be given to anyone who gives information which leads to the conviction of a person who violates the Act's prohibitions.

Prohibitions regarding Endangered species are varied. Except by permit, one cannot collect ("take") an Endangered species in the territorial United States, its territorial seas, or on the high seas, nor can anyone sell or offer in interstate or foreign commerce any such species. It is illegal to import or export an Endangered animal or plant or to carry, transport, or receive in interstate or foreign commerce such an animal or plant. It is not, however, illegal to own a member of an Endangered or Threatened species. Prohibitions and restrictions apply to live animals, as well as parts, products, offspring, eggs, or to the dead body and its parts.

Exceptions to the restrictions imposed by the Endangered Species Act may be allowed by permit for scientific study or to undertake measures which will aid in the propagation or survival of the species. There are no exemptions to State, Territorial, or Federal agencies regarding the need to obtain permits, except as outlined under Section 17.21(c)(3) of 50 CFR Part 17 (40 FR No. 188, pp. 44412-44429). Permit applications must be submitted according to Federal regulations contained in Parts 13 and 17, CFR; these can be obtained by writing to the Director of the Fish and Wildlife Service. Once submitted, applications are published in the *Federal Register* and anyone interested may submit comments on the application for a period of 30 days, at which time a decision is made.

Section 3(4) of the Endangered Species Act defines an endangered species as "any species which is in danger of extinction throughout all or a significant portion of its range" and Section 3(15) defines a threatened species as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Restrictions which apply to an Endangered species may or may not apply to a Threatened species depending upon whether the Secretary of the Interior considers such restriction necessary and advisable. However, permit applications for a Threatened species do not have to be published in the *Federal Register.* Also, for Threatened species, State law restrictions or any other special prohibitions can be substituted for Federal restrictions if so specified in the final rulemaking as it appears in the *Federal Register.*

A species is determined to be Endangered or Threatened because of any of five criteria as specified by Section 4(a)(1) of the Act. These are: 1) its range or habitat is presently or potentially threatened with destruction, modification, or curtailment; 2) overuse for commercial, sporting, scientific, or educational purposes; 3) depletion through disease or predation 4) inadequate laws or regulations; and 5) other natural or manmade factors affecting its continued existence. When preparing proposals, these factors are directly assessed as to their importance in determining the status of a species.

Authority for the final decision is delegated by the Secretary of the Interior to the Director of the U.S. Fish and Wildlife Service and his decision is based solely on biological data. In addition, the input of States or Territories, interested persons and organizations, Federal agencies, and when involved, foreign nations, is considered during the rulemaking process.

Critical Habitat

Section 7 of the Endangered Species Act allows "Critical Habitat" to be designated by the Secretary of the Interior as that habitat necessary to the survival of an Endangered or Threatened species. Included in consideration of factors involved in such a determination are: 1) space for normal growth, movements, or territorial behavior; 2) nutritional requirements, such as food, water, minerals; 3) sites for breeding, reproduction, or rearing of offspring; 4) cover or shelter; and 5) other biological, physical, or behavioral requirements. A "Critical Habitat" proposal may only be made for species occurring within the United States or its Territories; it can be made directly with the initial proposal for Endangered or Threatened status or at a later time.

A determination of "Critical Habitat" not only allows protection of the species involved, but also the habitat it requires to survive. All activities involving Federal agencies, or supported by Federal funding, must insure that they will not jeopardize the survival of an Endangered or Threatened species or harm an Endangered or Threatened species' "Critical Habitat." Unless "Critical Habitat" is specified, this is not the case.

Petitions and Suggestions

Anyone may petition the Secretary that an amphibian or reptile, or indeed any plant or animal, whether full species, subspecies, or unique population (animals only), be placed on the list of Endangered and Threatened Wildlife. This is done by writing the Director, U.S. Fish and Wildlife Service, and indicating the reasons for proposing the species' addition to the list; the Act requires that substantial information to warrant a review must be included with petitions.

Suggestions requesting that the Office of Endangered Species review the status of a particular species are often received. However, many amphibians and reptiles may be candidates for Endangered or Threatened status and it would be extremely time-consuming for personnel at the Office of Endangered Species to review thoroughly the literature for each animal for which a suggestion is received. Therefore, careful, well prepared reports accompanying suggestions will most likely receive attention before letters which simply express concern about the plight of particular species. The reason for this is clear. For the last two years, the Office of Endangered Species has not had a full time herpetologist on its staff; herpetological matters have been handled by other specialists who are more often occupied with the status of species in their own particular fields. Although I am presently assisting the Office of Endangered Species with their herpetological material, my appointment is only temporary. Therefore, the more thoroughly that Endangered and Threatened species reports are written, the better the chance for quick administrative action.

When suggesting that an amphibian or reptile be placed on the Endangered and Threatened Wildlife List, it would be best to include information of the type listed below. While there is no set "formula," reports by George Drewry and Kirkland Jones for the Golden Coqui, Richard Philibosian for the St. Croix Ground Lizard, and Herbert Harris, Robert Simmons, and Lanny Wilson for the New Mexican Ridge-nosed Rattlesnake provide excellent examples for future Endangered or Threatened species reports. It is primarily from their reports that the outline listed below is drawn.

I. General Information

A. Present and past distribution.

B. Estimated numbers.

C. Ecological requirements; natural history.

D. Habitat : physiographic, botanical, zoological. Includes general considerations as well as specific (to scientific names) associations.

E. Systematic status - especially if there is some question regarding status or nomenclature.

F. Significance or special considerations. An example would be ovoviviparity in the Golden Coqui.

G. Breeding potential in captivity.

II. Reasons for Consideration

A. Range or habitat destruction or modification - past, present, or future.

B. Overuse for commercial, sporting, scientific, or educational purposes.

C. Depletion through disease or predation.

D. Inadequate laws or regulations.

E. Other natural or manmade factors affecting existence.

III. Additional Comments

A. Status warranted.

B. Recommendations for actions to enhance the survival possibilities of the species.

C. Critical Habitat recommendation - both verbal and on topographical maps, if available.

D. Any other pertinent remarks.

It is absolutely essential to insure that reports document with literature references or information from those most familiar with the species involved, any statements which are of immediate importance to the species status. It is not enough simply to express concern, even if the status of a species appears obvious; concern must be backed up by data.

Once a species has been determined to be a candidate for consideration and sufficient background data are available, a Proposed Determination as either Threatened or Endangered and an Environmental Impact Assessment are prepared by the Office of Endangered Species' staff. This Proposed Determination is then published in the *Federal Register*, at which time public comments concerning the proposal are solicited for a period of 60 days. At the end of this period, comments are assessed as to their biological information, and a final decision is made concerning the species. The final decision with regard to the status of a species is based solely on the biological information; the public comments serve as an added source for this information, not as a voting contest on whether a species should be determined or not. Final Determinations are also published in the *Federal Register*. In the future, notice of Proposed and Final Determinations of amphibians and reptiles as either Threatened or Endangered will be sent to interested parties in the herpetological community.

Convention on International Trade

As a party to the 1973 Convention on International Trade in Endangered and Threatened Species of Wild Fauna and Flora, the United States has listed certain species of amphibians and reptiles as Endangered in accordance with Appendix I of the Convention. Section 9(c) of the Endangered Species Act of 1973 provides that it is a violation of the Act to trade specimens of species contrary to the provisions of the Convention. Even if any such species proves not to be Endangered as specified by the Act, it would still be subject to the provisions of the Convention, especially as regards importation and exportation for commercial purposes.

Summary

In the past, there has been much confusion about the Endangered Species Act. Most confusion surrounds the collection (allowed only with a permit in most cases) of Endangered or Threatened animals and the preservation of their habitat (the Act does not prohibit the activities of private individuals on their own lands except for actual collection of specimens; only the activities of Federally financed operations may be restricted if they endanger habitat vital to an Endangered or Threatened species). It is hoped that this paper has cleared up some confusion. Additional questions may be directed to Mr. Keith M. Schreiner, Associate Director - Federal Assistance, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C. 20240.

With increased knowledge of the provisions and limitations of the Endangered Species Act, it is to be hoped that the many amphibians and reptiles currently in need of consideration may receive the attention they deserve.

Publications Available Through the Office of Endangered Species

Endangered Species Act of 1973 (Public Law 93- 205; 87 Stat. 884).

Endangered and Threatened Species. Notice on Critical Habitats. (40 FR 17764-17765).

Convention on International Trade in Endangered Species of Wildlife Fauna and Flora (41 FR 24367-24381).

Endangered and Threatened Wildlife and Plants (41 FR 47180-47198).

Williams, J. D. 1976. A review of the Endangered Species Act of 1973. ASB Bulletin. 23:138-141.

Acknowledgments

I would like to thank Paul Opler, John Paradiso, and Ray Ashton for their comments and criticism of this manuscript.

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GEOGRAPHIC DISTRIBUTION

AMPHIBIAN AND REPTILE RECORDS AND RANGE EXTENSIONS FOR MEXICO. We report here new records of Mexican amphibians and reptiles presently in the collection of the senior author (EAL). Unless noted all specimens were collected by the authors.

AMPHIBIA

AMBYSTOMA TIGRINUM VELASCI. Neuvo Leon: EAL 4065 (5 ad.), EAL 4066 (28 larvae), 20.3 km W, 10.6 km N Dr. Arroyo at La Lajita on El Pequeno Road, 21 July 1975. Reported for Neuvo Leon but once before (Reese, 1971, J. Herp., 5 (1/2), and this is the second collection for this state. *CHIROPTEROTRITON PRISCA.* Coahuila: EAL 3577 (3 sp.), 17.9 km E San Antonio de las Alazanas, 22 July 1973; Ernest A. Liner and Richard M. Johnson; EAL 4011 (3 sp.), 14.5 km E San Antonio de las Alazanas, 16 July 1975. First salamanders reported for the state. *PSEUDOEURYCEA GALEANAE.* Nuevo Leon: EAL 3103 (14 sp.), Ojo de Agua at Pablillo, 17 July 1972; EAL 3105 (1 sp.), 13.7 km S Pablillo, 18 July 1972; EAL 3110 (2 sp.), 16.8 km S Pablillo, 18 July 1972; EAL 3789 (2 sp.), 3.4 km N El Orito, 17 July 1974; EAL 4031 (8 sp.), 13.9 km S Pablillo at Puerto de Cienguillas, 19 July 1975; EAL 4047 (2 sp.), 12.9 km N La Ascension, 19 July 1975. Known from three collections previous to this report (Taylor, 1941, Proc. Biol. Soc. Wash. 54:81-86; Walker, 1955, Occ. Papers Mus. Zool., Univ. Mich. 567; Reese, 1971, op. cit.). The localities listed here give further localities for Neuvo Leon. EAL 3789 constitutes the northernmost record to date. *BUFO COMPACTILIS.* Tlaxcala: EAL 868 (1 sp.), 3.4 km NW San Ildefonso Hueyotlipan, 8 July 1963; EAL 869 (8 sp.), 4.4 km SE Calpulalpan, 8 July 1963. Ernest A. Liner and Richard Whitten. First recorded for this state. *SCAPHIOPUS HAMMONDI MULTIPLICATUS.* Tlaxcala: EAL 866 (82 sp.), 3.9 km NW San Ildefonso Hueyotlipan, 8 July 1963; EAL 870 (1 sp.), 4.4 km SE Calpulalpan, 8 July 1963; Ernest A. Liner and Richard Whitten. First records for this state.

REPTILIA

KINOSTERNON FLAVESCENS FLAVESCENS. Nuevo Leon: EAL 4073 (1 sp.), 24.8 km S Dr. Arroyo, 21 July 1975. Most southern record of this turtle to be collected in the state. *EUMECES BREVIROSTRIS PINEUS.* Nuevo Leon: EAL 3388 (1 sp.), 12.9 km S Pablillo at Puerto de Cienguillas, 22 May 1973; Ernest A. Liner, Douglas A. Rossman and Robert L. Erwin; EAL 3583 (1 sp.), Arroyo Mesquital from Poterio Prieto to 7.7 km S, 24 July 1973; Ernest A. Liner and Richard M. Johnson; EAL 3795 (1 sp.), 7.9 km N San Juan de Mimbres, 17 July 1974; EAL 4032 (7 sp.), 13.9 km S Pablillo at Puerto de Cienguillas, 19 July 1975. The above records are new localities in the state and supplement those of Dixon (1969, Cont. Sci. L.A. Co. Mus. 168). *SCELOPORUS JARROVI OBERON.* Nuevo Leon: EAL 3765 (2 sp.), Laguna de Sanchez to San Isidro, 4.2 km E Laguna de Sanchez, 15 July 1974; EAL 3770 & 3772 (2 sp.), San Isidro to San Juan Bautista in Cañon San Juan Bautista, 15 July 1974; EAL 4089 (2 sp.), 4.2 km E San Isidro, 23 July 1975. Extends range east from Saltillo, Coahuila area approximately 64.5 km. *SCELOPORUS SPINOSUS SPINOSUS.* Nuevo Leon: EAL 3106 (2 sp.), 7.9 km N La Ascension, 18 July 1972; EAL 3107 (1 sp.), 16.0 km N La Ascension, 18 July 1972; EAL 3801 (1 sp.), 32.1 km S Galeana, 18 July 1974; EAL 3813 & 3814 (2 sp.), 6.1 km N La Ascension, 18 July 1974; EAL 3816 (4 sp.), 1.1 km N General Ignacio Zaragosa, 19 July 1974; EAL 3818 (1 sp.), 5.0 km N General Ignacio Zaragosa, 18 July 1974; EAL 3820 (2 sp.), 7.7 km N General Ignacio Zaragosa, 18 July 1974; EAL 3822 (1 sp.), 8.9 km N General Ignacio Zaragosa, 19 July 1974; EAL 3830 (1 sp.), 0.8 km N Mier y Noreiga, 20 July 1974; EAL 3834 (1 sp.), 9.0 km N Mier y Noreiga, 20 July 1974; EAL 4051 (1 sp.), 4.9 km N, 3.9 km SE La Ascension on La Caballada road, 19 July 1975; EAL 4061 (1 sp.), 5.6 km W Aramberri, 20 July 1975. Recorded but once in Nuevo Leon by Martinez (1967, Thesis, Universidad de Nuevo Leon) from Zaragosa. The above are further records for the state. *SCELOPORUS TORQUATUS BINOCULARIS.* Nuevo Leon: EAL 3599 (1 sp.), 8.7 km E Laguna de Sanchez in Cañon San Juan Bautista, 26 July 1973; EAL 3600 (1 sp.), 11.2 km E Laguna de Sanchez in Cañon San Juan Bautista, 26 July 1973; Ernest A. Liner and Richard M. Johnson; EAL 3764 (2 sp.), Laguna de Sanchez to San Isidro, 4.2 km E Laguna de Sanchez, 15 July 1974; EAL 3769 (3 sp.), San Isidro to San Juan Bautista in Cañon San Juan Bautista, 15 July 1974; EAL 3773 (12 sp.), San Juan Bautista to La Cienega in Cañon San Juan Bautista, 15 July 1974; EAL 4084 (6 sp.), 2.1 km E and to San Isidro, 23 July 1975. Recorded from Mexico only from the vicinity of Galeana and Arroyo Mesquital. These records extend range in Nuevo Leon approximately 63.0 km NNW of Galeana. *CROTALUS SCUTULATUS SCUTULATUS.* Nuevo Leon: EAL 4057 (1 sp.), 5.6 km W Aramberri, 20 July 1975. Recorded but twice for Nuevo Leon (Liner, 1964, Southwest. Natur. 8(4); Reese, 1971, op. cit.).The above is a new locality and fifth specimen reported for the state. *LAMPROPELTIS MEXICANA ALTERNA.* Nuevo Leon: EAL 4022 (1 sp.), 2.9 km W, 5.3 km S San Antonio de las Alazanas, Coahuila, 17 July 1975. This specimen represents the sixth for Mexico and the second for Nuevo Leon (Gehlbach, 1967, Cat. Amer. Amphib. Rept., 55.1).

Submitted by ERNEST A. LINER, 310 Malibou Blvd., Houma, La. 70360, RICHARD M. JOHNSON, 4170 Lantern Lane, Mobile, Ala. 36609 and ALLAN H. CHANEY, 1208 W. Richard, Kingsville, Texas 78363.

TESTUDINES

CHRYSEMYS PICTA BELLI (Western Painted Turtle). U.S.A., Oklahoma, Kay Co., 10 km NW Braman; 5 Aug. 1976 (shell and dry limbs); 6 Aug. 1976 (alive); Jody Trott and Larry Miller. Collection of R.L. Lardie, RLL 1439 (to be deposited in the Univ. of Kansas collection) and collection of Larry Miller, alive. Establishes presence in Oklahoma. Nearest recorded populations are in Harper Co., Kansas (Collins, 1974, Amphibians and Reptiles in Kansas, Univ. Kansas Publ. Mus. Nat. Hist.). Submitted by LARRY MILLER, Caldwell Elementary School, Caldwell, Kansas 67022 and RICHARD L. LARDIE, School of Biological Sciences, Oklahoma State University, Stillwater, Oklahoma 74074.

TERRAPENE ORNATA ORNATA (Ornate box turtle). U.S.A., Illinois, Woodford Co., 1.5 km S Spring Bay on Ill. Hwy. 26; 15 June 1975; D. Moll, J.K. Tucker. Identified by D. Moll and released. First record from county and extends range about 80 km N of nearest previous record on E side of Illinois River (Smith, 1961, Illinois Nat. Hist. Surv. Bull. 28(1):1-298). Fayette Co., 5 km E St. Elmo at Jct. of Ill. Hwy. 128 and Penn Central RR; 3 May 1975; D. Moll, J.K. Tucker. Collection of J.K. Tucker, JKT-66. First record from county and extension of range 14 km E of nearest record in Effingham Co. (Smith, Op. cit.). Submitted by DON MOLL and JOHN K. TUCKER.

SERPENTES

CEMOPHORA COCCINEA COPEI (Scarlet snake). U.S.A., Texas, Sabine Co., Sabine National Forest, 22.5 km SE Hemphill; 6 June 1975; T.W. Lewis, Jr. and J.C. Kroll. Stephen F. Austin State University, School of Forestry, SFAWC 21 H. Jefferson Co., 4.8 km N Beaumont; 18 July 1975; J. Ashcraft. T.W. Lewis, Jr. Collection of J. Ashcraft, alive and uncatalogued. Jasper Co., 3.2 km N Jasper; 17 Sept. 1973; T.W. Lewis, Jr., J.R. Dixon. Texas A&M University, TCWC 48409. Jasper Co., Jasper city limit on Hwy 190 W.; 15 July 1974. Joe Wells. T.W. Lewis, Jr. Not retained. Newton Co., 3 km W Burkeville; 23 Sept. 1973; S.F. Holms. J.R. Dixon. Texas A&M University, TCWC 48410. All are county records extending range into mid-East Texas (Raun and Gehlbach, 1972, The Dallas Museum of Natural History, Dallas, Texas, Bull. 2). Submitted by TEAIRL W. LEWIS, JR., School of Forestry, Stephen F. Austin State University, Nacogdoches, Texas 75961, and JAMES R. DIXON, Dept. of Wildlife and Fisheries Science, Texas A&M University, College Station, Texas 77843.

ELAPHE GUTTATA GUTTATA (Corn snake). U.S.A., Kentucky, Hart Co., 4.8 km E Bonnieville; 11 May 1975; B. Bloomer, R.E. Todd, Jr. Collection of R.E. Todd, Jr., RET 210. Extends range 22.5 km N of previous record and supplements records in Collins (1970, Trans. Kentucky Acad. Sci. 31(1-2):49-50). Submitted by ROBERT E. TODD, JR., Rt. 1, Box 90-B, Sonora, KY 42776.

CAUDATA

AMBYSTOMA TIGRINUM VELASCI. (Plateau tiger salamander.) Mexico, Zacatecas, 2.7 km S Trancoso; 13 July 1974; Ernest A. Liner and Harold A. Dundee. Ernest A. Liner private collection, EAL 1169. First record for a salamander from the state of Zacatecas (Smith and Taylor, 1948, Bull. USNM., #194; Gehlbach, 1967, Cat. Amer. Amphib. Rept., 52.1). Submitted by HAROLD A. Amphib. Rept., 52.1). Submitted by HAROLD A. DUNDEE, Department of Biology, Tulane University, New Orleans, LA 70118 and ERNEST A. LINER, 310 Malibou Blvd., Houma, LA 70360.

PLETHODON CINEREUS (Red-backed salamander). U.S.A., Illinois, Wabash Co., 7 km ESE Mt. Carmel at Beall Woods State Park; 5 June 1976; D. Moll, J.K. Tucker. Collection of J.K. Tucker, JKT-65. First record for county and extension of range 35 km E of nearest record (Highton, 1962, Bull. Florida State Mus. 6(3):235-367) and 93 km S of Crawford Co. records (Smith, 1961, Illinois Nat. Hist. Surv. Bull. 28(1):1-298). Submitted by DON MOLL and JOHN K. TUCKER, Department of Biological Sciences, Illinois State University, Normal, Il. 61761.

SALIENTIA

HYLA AVIVOCA AVIVOCA (Western Bird-Voiced Tree Frog). U.S.A., Arkansas, Pope Co., 8.4 km NE Atkins; 23 April 1976; Glyn Turnipseed and Bruce Shackleford; Arkansas Polytechnic College Collection, No. 58. Verification by and additional specimen deposition to Dr. Ronald G. Altig, Dept. of Zoology, Mississippi State University, Mississippi State, Mississippi. Specimen deposition also to Dr. R.G. Zweifel, Dept. of Herpetology, American Museum of Natural History, AMNH 92872. First record for Arkansas. Nearest population on record is 226 km SW in McCurtain Co., Oklahoma (Blair and Lindsay, 1961, Southwest. Natur. 6(3-4):202). The Pope Co., Arkansas population was found in a Tupelo Gum-Bald Cypress (*Nyssa aquatica-Taxodium distichum*) association. The association may represent the western-most edge of the range for Tupelo Gum. Other anurans calling near *H.a. avivoca* were *Rana catesbeiana*, *R. utricularia*, *Acris crepitans blanchardi*, *Bufo woodhousei fowleri*, and *Hyla versicolor*. *H.a. avivoca* has also been heard at other locations in the vicinity but no specimens

have been collected to date. We suspect other populations of *H. a. avivoca* occur in Arkansas. Submitted by GLYN TURNIPSEED, Dept. of Biology, Arkansas Polytechnic College, Russellville, AR 72801.

SHORT REPORT

NEW RECORDS FOR AMPHIBIANS AND REPTILES FOR THE DEPARTMENT OF COLON, HONDURAS. During the course of field work around Trujillo, Depto. Colon, Honduras, we have amassed a number of new departmental records which add to those reported by Meyer and Wilson (1971, Los Angeles Co. Mus. Contrib. Sci., no. 218; 1973, Los Angeles Co. Mus. Contrib. Sci., no. 244) and Wilson and Meyer (in press, The snakes of Honduras, Ralph Curtis Publications, Hollywood, FL). Catalog numbers refer to author's field numbers.

New records: *HYLA STAUFFERI*- ca. 6 km NE Trujillo (DEH 12052); *PHRYNOHYAS VENULOSA* - ca. 4 KM W Trujillo (DEH 11650); *GYMNOPHTHALMUS SPECIOSUS* - ca. 3 km E Trujillo (DEH 12023-24); *LEPIDOPHYMA FLAVIMACULATUM* - Mts. above Trujillo (DEH 12020); *BOA CONSTRICTOR* - Trujillo (LDW 4550); *ELAPHE TRIASPIS* - Mts. above Trujillo (DEH 12031); *ENULIUS FLAVITORQUES* - Rio Grande, ca. 1 km W Trujillo (LDW 4549); *OXYBELIS FULGIDUS* - ca. 2 km E Trujillo (LDW 45710), ca. 7 km E Trujillo (LDW 4572); *TRETANORHINUS NIGROLUTEUS* - Barrio Rio Negro, Trujillo (DEH 12000, 12002, 12034; LDW 4577-4582).

Submitted by DONALD E. HAHN, Marcus J. Lawrence Memorial Hospital, Cottonwood, AZ 86326 and LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, FL 33176.

NEW DISTRIBUTIONAL RECORDS FOR REPTILES FROM HONDURAS. During the course of field work designed to survey the flora and fauna of Honduras, various faculty members and students of the Departamento de Biologia, Universidad Nacional Autonoma de Honduras (UNAH), Tegucigalpa, D.C., Honduras have added to the University's collections a number of specimens of reptiles representing new distributional records. These supplement the information provided by Meyer and Wilson (1973, Los Angeles Co. Mus. Contrib. Sci., no. 244:1-39), Wilson and Meyer (in press, The snakes of Honduras, Ralph Curtis Publications, Hollywood, Florida), and Hahn and Wilson (in press, Herp. Rev.).

Range extensions: *SCELOPORUS SQUAMOSUS.* Potrerillos, Depto. Cortes; 14 April 1975; E. Vargas. M. Eraso. UNAH 5279. New record for the department and range extension of 103 km N of nearest record in Comayagua Valley to the southern end of the Sula Plain. *CNEMIDOPHORUS LEMNISCATUS.* Brus Laguna, Depto. Gracias a Dios; 25 January 1976; G. Cruz. J. Espinosa. UNAH 5386. First record for department and range extension of 157 km E of nearest record at Trujillo into the Mosquitea of Honduras. *TRETANORHINUS NIGROLUTEUS.* Brus Laguna, Depto. Gracias a Dios; 26 January 1976; G. Cruz. J. Espinosa. UNAH 5371. New record for department and range extension of 157 km E of nearest record at Trujillo into the Mosquitea of Honduras.

New departmental records: *CNEMIDOPHORUS DEPPEI.* La Paz, Depto. La Paz; 23 February 1976; G. Cruz. J. Espinosa. UNAH 5227. *CONOPHIS LINEATUS.* Magdalena, Depto. Intibuca; 5 January 1973; Jose Romulo Martinez. UNAH 5090. *DRYADOPHIS DORSALIS.* Yamaranguila, Depto. Intibuca; 27 June 1974; Jose Romulo Martinez. UNAH 5010. *GEOPHIS HOFFMANNI.* Mata de Maiz, Depto. Colon; 3 May 1975; G. Cruz. J. Espinosa. UNAH 5358. *HYDROMORPHUS CONCOLOR.* Nr. San Pedro Sula, Depto. Cortes; 15 April 1975; collector unknown. UNAH 5045.

Submitted by LARRY DAVID WILSON, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, Miami, FL 33176, BECKY MYTON, and GUSTAVO CRUZ, Departamento de Biologia, Universidad Nacional Autonoma de Honduras, Tegucigalpa, D.C., Honduras, Centro America.

AMPHIBIANS AND REPTILES FROM JEKYLL ISLAND, GLYNN COUNTY, GEORGIA. From 30 June to 6 July 1975, we collected or observed twenty species of amphibians and reptiles on Jekyll Island. Thirteen species were not previously reported by Hillestad (1974, Annotated list of amphibians and reptiles of the coastal islands of Georgia. IN Johnson, A.S., H.O. Hillestad, S.F. Shanholtzer, and G.F. Shanholtzer. An ecological survey of the costal region of Georgia. Nat. Parks Ser. Sci. Mono. Ser. No. 3:XV+233 pp.). Specimens deposited in the collection of Rutgers University in Newark are designated RUN, others were captured, identified and released.

AMPHIBIANS: *Bufo terrestris* (RUN 4160), found throughout the island; *Limnaoedus ocularis*, called from ditches, rain pools and ponds throughout the island; *Hyla femoralis* (RUN 4150), restricted to the pine woods in the center of the island; *Gastrophryne carolinensis* (RUN 4145), called from ditches and flooded fields throughout the island; *Rana catesbeiana*, resident in large permanent ponds on the Golf Course in the center of the island; *Rana utricularia* (RUN 4139), found throughout the island.

REPTILES: *Ophisaurus ventralis* (RUN 4152), a single individual was found drowned in a flooded field in the center of the island; *Coluber constrictor,* a DOR was found on the southern tip of the island; *Elaphe guttata* (RUN 4158), found throughout the island; *Natrix fasciata*, one DOR was identified from the southern end of the island; *Thamnophis sauritus* (RUN 4153), several were taken at the southern end of the island; *Thamnophis sirtalis* (RUN 4156), found throughout the island.

Submitted by JAMES D. ANDERSON, SUSAN L. ANDERSON, KEITH A. HAWTHORNE, and SALOME C. LITWIN, Dept. of Zoology, Rutgers University, Newark, NJ 07102.

Thamnophis butleri (Butler's Garter Snake). Canada, Ontario, Dufferin Co., East Luther Township, E shore of Luther Lake. 4 August 1974. H.M. Karstad, P.A. Westell, and F.W. Schueler. To be deposited in National Museum of Canada, FWS 4829 -- 4832. 3 females and 20 young born in captivity. Northeasternmost Ontario record by 215 km. The adults appear somewhat intermediate between *T. butleri* and *T. brachystoma* as follows:

	Upper Labials Left	Right	Dorsal Scale Rows
*T. butleri**	7	7	19-19-17
FWS 4830	7	7	17-17-17
FWS 4831	7	7	19-18-17
FWS 4832	7	6	19-17-17
*T. brachystoma**	6	6	17-17-15

*Conant, R. 1950. Bull. Chicago Acad. Sci. 9:71-77.

Canada, Ontario, Kent Co., Walpole Island. 8 June 1971. F.W. Schueler, J.D. Rising, M.A. Telford, and B. Savan. NMC 16240. Gravid female; skeleton and viscera, skin lost by fire.

Submitted by FREDERICK W. SCHUELER and PAUL A. WESTELL. Dept. of Zoology, Univ. of Toronto, Toronto, M5S, 1A1, Ontario, Canada.

HERPETOLOGY'S LOSS

Isabelle dePeyster Hunt Conant died 3 November 1976 in Albuquerque, New Mexico, of multiple myeloma, after a long illness. She was the first woman photographer on the staff of any zoo, and she served in that capacity at the Philadelphia Zoological Garden for ten years during the period from 1943 to 1953. Her pictures of animals appeared in newspapers and other publications throughout the world, and because of her husband's interest in herpetology she took many thousands of photographs of reptiles and amphibians, hundreds of which were used in the publications of scores of scientists and in Dr. Conant's books.

Her greatest contribution was the art work for her husband's *Field Guide to Reptiles and Amphibians of Eastern and Central North America*, the second edition of which contained more than 1,000 illustrations. About half of these were reproductions of photographs, which she hand-colored from life to insure that the often brilliant hues of the frogs, salamanders, turtles, lizards, and snakes were reproduced with complete fidelity.

Mrs. Conant was born in Staten Island, New York, on 17 May 1901. For several years she served as a reporter for the Staten Island Advance, and in 1936 she joined the staff of the newly built Staten Island Zoo as its business manager and publicity director. In 1942 she transferred to the Philadelphia Zoological Garden.

She is survived by her husband, Dr. Roger Conant, Adjunct Professor at the University of New Mexico and Director Emeritus of the Philadelphia Zoo, and by many nieces and nephews.

Gifts may be sent to the American Cancer Society.

BOOK REVIEW

More on Nessie: A review of THE MONSTERS OF LOCH NESS (Roy P. Mackal: 1976; Swallow Press, 401 pp. $12.50) and THE LOCH NESS STORY (Nicholas Witchell: 1975; Penguin Books, 156 pp. $1.95).

Stories and books on Nessie exist in superabundance. No other animal or, if you prefer, phenomenon has had so much written about it with so little evidence. Most Nessie books bombard the reader with observational data, so presented to convince you that the Loch Ness monsters are giant worms, pleisosaurs, long-neck seals, or whatever strikes the author's fancy. These two books are striking exceptions, particularly in view of the news extravaganzas of this past year.

Witchell relates the history of the search for Nessie from its beginnings in the summer of 1934 to the partial success of last summer, 1975. The style is anecdotal but informative. The stories and observations are not new but Witchell's style and organization creates a highly readable and delightful book. The book recommends itself, in that it presents the evidence without promulgating a pet theory on the monster's identity.

Mackal's book is the first attempt to objectively analyze the mass of observational, photographic, and sonar evidence and to retain only the best. The book is nearly equally divided into three sections (14 chapters) of text and twelve appendices of data. The first section tells of Mackal's hesitant entrance into the search in 1965 and his supervision of the Loch Ness Investigation Bureau's technical operations in 1966 to 1970. Section two is a survey and discussion of the three classes of data, and, in section three, these data are analyzed with the attempt to determine the most likely identity of Nessie. The appendices contain a variety of information from classification tables of candidate animals, summaries of previously unpublished limnological data, and, most importantly, a listing and evaluation of the major observational, photographic, cinematic, and sonar data. These latter appendices in conjunction with chapter two make this book a must for even the most casual student of Loch Ness.

In the analysis section, Dr. Mackal first lists the possible candidates (mammals, reptiles, amphibians, fish, worms, and mollusk); then he compares the morphology, behavior, and environment of the candidates with that of Nessie. On the basis of the analysis, he postulates that the Nessies are either large thick-bodied eels or aquatic amphibians "probably some evolutionary descendent of an embolomer." He favors the latter interpretation. Although his character analysis matrix does show that Nessie shares more characters with amphibians than any of the other animals, I do not believe equal weight can be given to all the characters, especially salinity tolerance. The Nessie population has to be derived from the sea, for 30,000 years ago Loch Ness was covered by a glacier. Speculations on the Nessie identity will cease only when we have had a chance to closely examine one. Mackal's speculation or hypothesis has the advantage, since it is based on an objective analysis.

Of the two books, I prefer Mackal's because of its emphasis on facts and analysis; however, I recommend both. Together, they provide a complete summary of the search for Nessie, its disappointments and its elations.

GEORGE R. ZUG
Division of Reptiles and Amphibians
Smithsonian Institution
Washington, DC 20560

WANTED: INDIGO INFORMATION

IF YOU HAVE INFORMATION CONCERNING THE CURRENT STATUS OR CONSERVATION OF THE EASTERN INDIGO SNAKE AND ITS' HABITAT IN GEORGIA, YOU CAN HELP. THE GEORGIA NATURAL RESOURCES BOARD MAY LIST THE ANIMAL AS A PROTECTED SPECIES UNDER THE PROVISIONS OF THE ENDANGERED WILDLIFE ACT OF 1973. WRITE TO Mr. Joe Tanner, Commissioner, Georgia Department of Natural Resources, 270 Washington Street, S.W., Atlanta, Georgia. EXPRESS YOUR OPINION ON THIS IMPORTANT ISSUE, AND ASK THAT YOUR LETTER BE FORWARDED TO THE NATURAL RESOURCES BOARD.

ERRATA

Patterns of mate-seeking and burrow use in a southern Florida population of *Gopherus polyphemus.* HR 7(2):80. Line 9, "vist" should read visit; line 9-10, "female" should read females; line 15, "where" should read there.

Geographic distribution: *Stilosoma extenuatum*. HR 7(3): 123. Line 5, "Douglas" should read Douglass; line 6, "uncataloged" should read uncatalogued; line 8, "SW" should read SE.

Geographic distribution: Line 1 should read: *Bufo alvarius* (Colorado River toad). HR 7(3):125. Line 4 should read: W (R.S. Funk 304);...Line 8 should read: ...Herpetologica 7(4):196).

SIGMA XI GRANTS IN AID OF RESEARCH AWARDS FOR 1975-76 IN "HERPETOLOGY"

J. David Archibald, University of California, Berkeley. Fossil mammalia and selected reptilia of the Hell Creek formation, and the geology of the Tullock and Hell Creek formations, Garfield County, Montana. $100.

Susan M. Case, University of California, Berkeley. Evolutionary studies of selected North American frogs of the genus *Rana* (Amphibia, Anura). $125.

Harry W. Greene, University of Tennesse. Comparative aspects of prey handling by constricting snakes. $100.

Susan P. Jarrett, West Virginia University. The effect of N-methyl-N'-nitro-N-nitrosoguanidine on lens regeneration *in vitro* from the dorsal and ventral iris of *Notophthalmus viridescens*. $100.

Robert H. Kaplan, Brooklyn College. Energetic aspects of reproductive and developmental modes in the genus *Ambystoma* (Amphibia: Urodela). $100.

Alvan Karlin, Miami University, Oxford, Ohio. Distribution and genetic variation of the dusky salamander, *Desmognathus fuscus*, in the southern Appalachian mountains. $120.

Robert C. Madden, Marymount College. The role of olfaction in the homing behavior of box turtles (*Terrapene carolina*). $100.

Matthew D. Moore, West Virginia University. Isolation of the lens factor in lens regeneration of *Notophthalmus viridescens*. $100.

William S. Parker, Mississippi University for Women. Reproductive patterns and demography of four anurans in northern Mississippi. $150.

Karen K. Patterson, Wake Forest University. The metamorphic strategies of the mole salamander, *Ambystoma talpoideum*, in three aquatic habitats near Aiken, South Carolina. $100.

Laurence V. Pomeroy, University of California, Riverside. The nature and role of cannibalistic and herbivorous morphs in tadpole populations of spadefoot toads in southeastern Arizona. $100.

David L. Schaub, Washington State University. The reproductive ecology of the Pacific treefrog. $100.

Bruce Shapiro, University of Nevada. Effects of histamine injections on regeneration in *Notophthalmus viridescens* and *Rana pipiens*. $100.



Herpetological Prodigy: "19, 20...Why did I ever decide to revise the Boidae..." MPM Photo - Johnson.

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SSAR ELECTION RESULTS

CHAIRMAN-ELECT ..... Joseph T. Collins
TREASURER ..... Henri C. Seibert
SECRETARY ..... Stephen R. Edwards
DIRECTORS (1977-79) ..... James B. Murphy
Tom R. Johnson
DIRECTOR (1977) ..... Roy W. McDiarmid

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

The Society for the Study of Amphibians and Reptiles will hold its 20th annual meeting jointly with the Herpetologists' League at The University of Kansas in Lawrence on 8-13 August 1977. In addition to contributed papers, the meetings will feature: 1) a symposium on The South American Herpetofauna: Its Origin, Evolution, and Dispersal, with Implications for its Preservation involving 24 participants from 11 countries; 2) a special program on regional herpetological societies; 3) photographic, art, and live animal exhibits. Chairman of the local committee is William E. Duellman. Registration forms, calls for papers, and details of meetings will be mailed to all members in March.



NEOTROPICAL NEWS

The National Museum of Costa Rica is publishing a French-Spanish collection of papers on bromeliad biology, "Biología de las Bromeliáceas", volume one of the Natural History classics of Costa Rica series, edited by the Museum's director, Luis Diego Gómez.

The bulk of this volume consists of C. Picado's "The Epiphytic Bromeliads as a Biological Millieu" published as a facsimile. Picado's classic work (in French: Les Bromeliaceés Epiphytes Considerees Comme Millieu Biologique) occupied 146 pages and 28 plates of the Bulletin Scientifique France-Belgique in 1913. There are also two other short papers by Picado, reprinted from the Comptes Rendús of the Paris Academy of Sciences.

The book also features important previously unpublished papers; an introduction and review of the bromeliad fauna (exclusive of amphibians and reptiles) by Gomez and notes on the phytogeography and physiological ecology of Costa Rican bromeliads by Kathy and John Utley. Of herpetological interest is a paper by D.C. Robinson on the bromeliad amphibians and reptiles of Costa Rica, including the first description of *Hyla picadoi*, a frog which E.R. Dunn named after Costa Rican biologist Clodomiro Picado T.

This volume will consist of about 250 pages and will be available in July for US $8.00, postpaid, from: Museo Nacional de Costa Rica, Apartado 749, San José, Costa Rica, Central America.

IN THE NEWS

The US Department of the Interior has dropped plans to comply with one of the provisions of the Lacey Act of 1900, which was aimed at cutting imports of wild species that might take over habitat and food used by native animals. An example is the African clawed frog, formerly used in pregnancy tests. Thousands have been found thriving in a California reservoir.

Proposals drafted since 1974 to comply with the law were opposed by the pet industry, and were abandoned partly because the Interior Department would not have enough money or staff to enforce regulations. Fish and Wildlife Service Director Lynn Greenwalt said Congress should enact legislation to strengthen the Lacey Act and clarify the Department's authority to regulate imports of harmful species. Imports of exotic species have doubled between 1968 and 1971.

UPI in Milwaukee *Journal*

A huge crocodile ate a man who was assembling a raft of logs in a Borneo river.

AP in Milwaukee *Journal*

A man in Sitiawan, Malaysia was fined $100 after pleading guilty to unlawfully killing a water monitor lizard. He was arrested after two Game Rangers investigated a crowd near a shop and found the man in possession of the meat and skin of a water monitor lizard, a protected animal.

New Straits Times,
Kuala Lumpar, Malaysia

In Stockholm, Sweden, three poisonous snakes, a saw-scale viper (*Echis carinatus*), a tropical rattlesnake, (*Crotalus durissus*), and an Argentinian horned viper, were used as guards for the "Star of Lanka" a 392-carat Blue star sapphire worth $429,000 at an exhibition of precious stones.

"Snake expert" Olle Rosenqvist stated: "We selected the most poisonous, the most aggressive and the fastest snakes in the world for this job. Together, these three species form a lethal triangle impossible to crack. I put them on the edge of starvation for a week and they are in top shape right now, stuffed with poison. Each one of them is capable of seven fatal bites. With those three together, death is 100% certain within ten minutes.

UPI in the Los Angeles *Times*

Disturbed by the disappearance, from around its coasts, of the sea turtle, which once formed one of the basics of the Indian Ocean islanders' diet, Seychelles has called for an urgent conference of all the Indian Ocean nations. The survival of the sea turtle is a matter of emergency, according to Seychelles President James Mancham. In 1968 when it was still a British colony, Seychelles passed laws aimed at ensuring the survival of the turtles. The ban on turtle fishing lasted until last year when, as independence approached, the Seychelles Assembly lifted the ban. Since then, however, no turtles have been landed by fishermen for sale in Victoria, the capital. The Seychelles sacrifice, Mancham said, has been to the advantage of turtle fishermen off the coast of East Africa and the Island of Mauritius, where the markets were flooded with turtle meat.

Agence France-Presse in Milwaukee *Journal*

The Board of Supervisors of Santa Cruz County, just south of San Francisco, California, has just passed a series of residential regulations designed to save the Santa Cruz long toed salamander (*Ambystoma macrodactylum croceum*), one of six salamanders on the endangered species list. Under the new rules, the culmination of a seven year campaign to save the creatures, any residence in a designated square mile portion of the county with a retaining wall more than 100 feet long must have ramps built into the wall to facilitate the salamander's breeding migration. In addition, streets must have rounded rather than square curbs; hillside homes must be built on columnar supports instead of enclosed foundations and surrounding ground must be kept vegetated as cover.

New York Times Service in
Milwaukee *Journal*

British Botany Professor Tony Swain states that dinosaurs are extinct today mostly because they had very poor taste. Swain says that new findings indicate dinosaurs had almost no taste buds and therefore couldn't tell when they were eating poisonous plants, which evolved about the time dinosaurs disappeared. He adds that many dinosaur skeletons are found in contorted positions indicating they died from a painful stomach poison.

ZNS in Bloomington-Normal, Ill., *Morning Sun*

In the middle of a 20,000 acre oak and pine forest 25 miles from Houston, Texas developers are building a town, The Woodlands, that will eventually house over 100,000 people. It is the largest scale project to date in the 'urban wildlife' movement, and is designed to have the best of both worlds- the city and the country-within easy reach of everybody.

Several thousand acres are being left as undeveloped "open space". Trees are removed only on the precise spots slated for construction, and the natural ground cover of mulch, pine cones and dead leaves take the place of grass. As a result, armadillos, deer, pileated woodpeckers, rattlesnakes and other wildlife continue to inhabit The Woodlands, where 1,000 people already reside.

Wall Street Journal



CURRENT LITERATURE

NOTICE: THE CURRENT LITERATURE PROJECT IS NOW BEING HANDLED BY DR. RICHARD D. WORTHINGTON, UNIV. OF TEXAS - EL PASO. ALL SEARCHERS: PLEASE NOTE THE CHANGE IN ADDRESS.

SEARCHERS: AS THE TITLES WILL BE PUBLISHED 4 TIMES PER YEAR, TRY TO SEND YOUR TITLES IN AT LEAST 4 TIMES A YEAR TO HAVE AN APPROXIMATELY EQUAL LISTING EACH ISSUE IN HR.

AN UPDATED LIST OF JOURNALS SCANNED WILL BE PUBLISHED WITHIN A FUTURE HR. ANY QUESTIONS, COMMENTS, ETC. SHOULD BE SENT TO:

DR. RICHARD D. WORTHINGTON
DEPARTMENT OF BIOLOGY
THE UNIVERSITY OF TEXAS
EL PASO, TEXAS 79968

A

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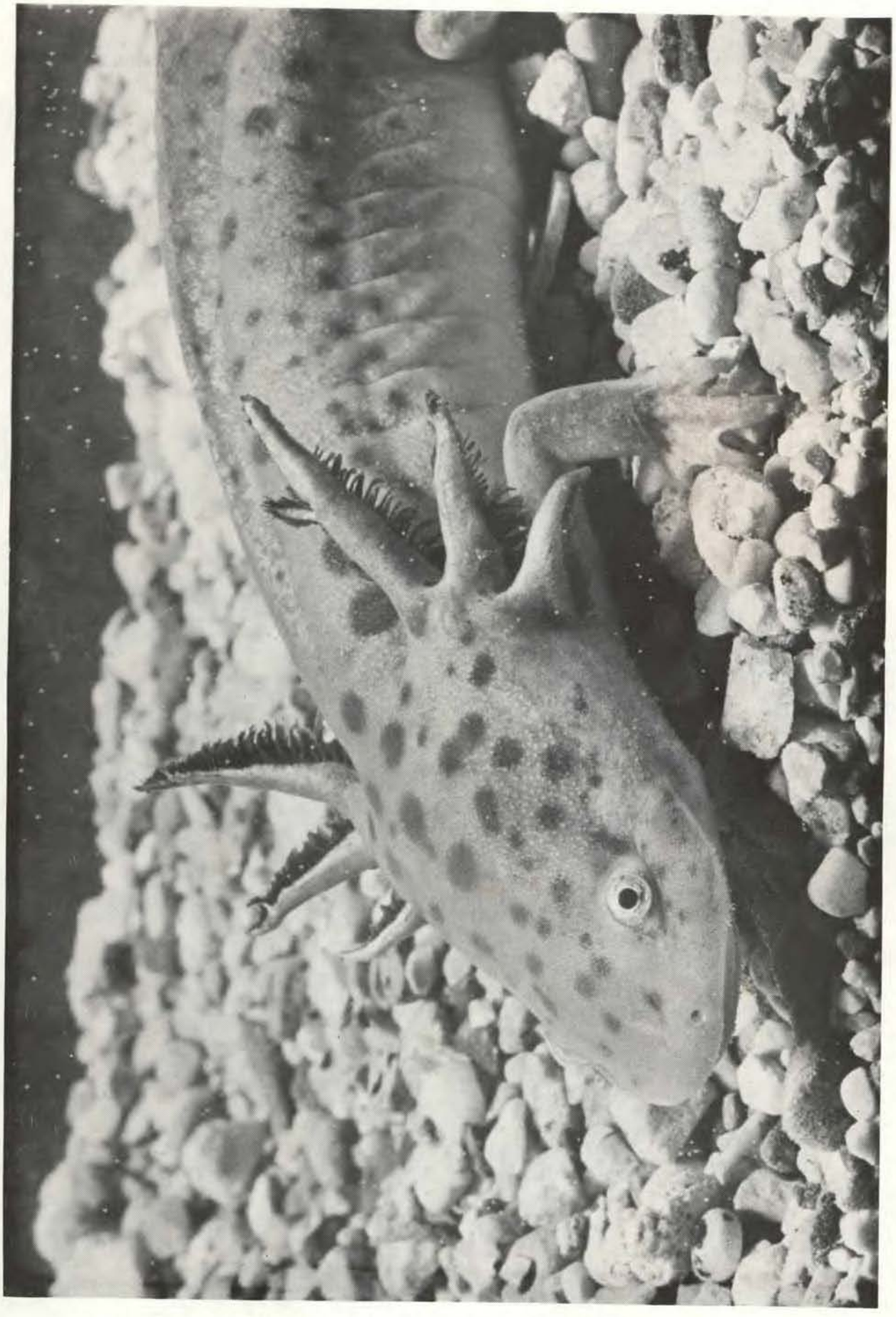
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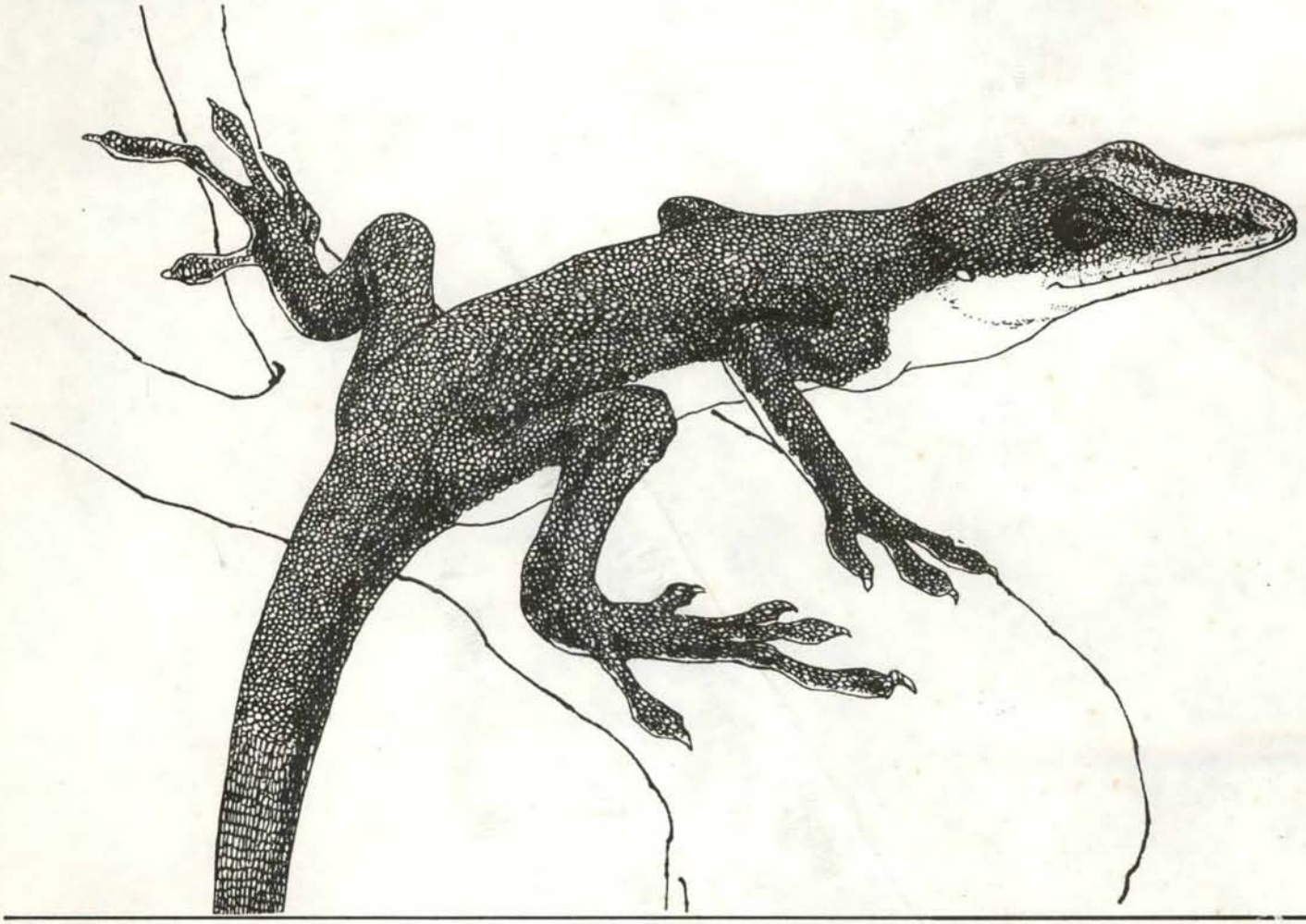
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Tiger salamander, *Ambystoma tigrinum* larva from near Marshall, Saline Co., Missouri. Photo MPM - Mahlberg.

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HERPETOLOGICAL REVIEW

Volume 7, Number 3

Table of Contents

106 ON TRANSPLANTING ALLIGATORS by James D. Lazell

107 REPORT OF THE SSAR RESOLUTIONS COMMITTEE

108 ENVENOMATION IN SNAKES AND ITS TREATMENT WITH ANTIVENIN by Frank Groves

109 TERRITORY AND HOME RANGE MAPPING FOR LIZARDS AND OTHER SMALL ANIMALS: A PHOTOGRAPHIC METHOD by Carol A. Simon

110 COURTSHIP-LIKE BEHAVIOR OF IMMATURE TURTLES by Michael A. Morris

111 ESCAPE BEHAVIOR OF THE SOUTHERN PLAINS SKINK by Jeffrey Howard Black

112 *THAMNOPHIS ELEGANS* CAPTURES *SOREX EMARGINATUS* by Rollin H. Baker and Robert G. Webb

113 PREDATION ON IGUANID LIZARDS BY THE ROUNDTAIL CHUB, *GILA ROBUSTA GRAHAMI*, AT FOSSIL CREEK, ARIZONA by Lyn C. Neve

114 *LAMPROPELTIS TRIANGULUM ELAPSOIDES* BY John Groves and Robert J. Assetto

114 OWL PREDATION ON *AMBYSTOMA TIGRINUM* by J. Alan Holman

115 EARLY EGG DEPOSITION BY THE SOUTHERN BLACK RACER, *COLUBER CONSTRICTOR PRIAPUS* by James C. Gillingham

116 NOTES ON EGGS AND HATCHLINGS OF *XENOCALAMUS BICOLOR LINEATUS* ROUX FROM SOUTH AFRICA by William R. Branch and Rod W. Patterson

120 REGISTRY FOR REPTILE PATHOLOGY

120 LOUIS J. PISTOIA OBITUARY

121 FEDERAL WILDLIFE PERMIT OFFICE ESTABLISHED

122 GEOGRAPHIC DISTRIBUTION

129 CURRENT LITERATURE

FRONT COVER: Drawing by James Derryberry

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CONSERVATION
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April 26, 1976

The Editor, Herpetological Review
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ON TRANSPLANTING ALLIGATORS

I read with chagrin your report on the National Audubon Society's recommendation to transplant Louisiana alligators to other parts of the species' range (Herp. Rev. 6(4): 114). I am staff herpetologist for Massachusetts Audubon Society and nominally on the joint scientific staff with National Audubon Society. I was never consulted in this matter, deprecate the decision, and disavow all connection with it.

I am extensively familiar first hand with the alligator situation in Louisiana and adjacent states. The coastal marsh alligators are dramatically different from inland swamp alligators in behavior and breeding biology; the genetic basis for the differences is unproven, but certainly highly probable. It is in the coastal marshes that alligators are described as "overpopulated". I believe transport and release of coastal marsh alligators to other parts of the species' range, especially to inland swamps, will be at best a cruel way to kill alligators and at worst a catastrophe for natural patterns of geographic variation.

Alligators are doing very well in most parts of their former range where suitable habitat remains. Even in areas where habitat exists and they are rare, we can confidently expect the native stocks to rapidly recuperate. I doubt that alligators are "overpopulated" anywhere. In any case, harvesting "surplus" Louisiana marsh alligators - if properly controlled - could not hurt the species and might materially decrease demand for the hides of genuinely endangered tropical crocodilians.

Conservation agencies, like my own, are often dominated by highly altruistic, well-meaning individuals with a dearth of biological knowledge. Even at the Ph.D. level, ornithology is still larded with bird fanciers who actively support programs of introducing exotics. I believe herpetologists should behave more responsibly, and hope that SSAR will publicly oppose such programs in the future.

Sincerely,

James D. Lazell, Ph.D.
Scientific Staff

JDL:mjl

REPORT OF THE SSAR RESOLUTIONS COMMITTEE
(unofficial version)

Preamble: When Chairman Vial asked me to chair the Resolutions Committee, I went to an experienced hand at SSAR meetings for advice in drafting the resolutions statement and his advice was: "Keep it light and for God's sake, keep out the whereas's!" In an attempt to follow his advice, I have taken the Committee's recommendations and edited them with the result that the following is light to the verge of being vaporous.

Be it resolved that:

Whereas, (Sorry about that, but can you think of any other way to start? That's the only one, I promise) the 19th Annual Meeting of the SSAR at Miami University has been a most successful one, with over 300 paid attendance (and innumerable unpaid ones, herpetologists having long ago found that tightfistedness has high fitness), we resolve to extend our thanks and appreciation to the following people who made it all possible.

To the Local Committee: Co-Chairmen, Doug Taylor and Shelly Guttman. Registration, Lynne Lohmeier, Melinda Moore, Susan Small, Mali Hutchison, Sara Woolpy, and Neil Ford. (Note from Doug Taylor: Lynne, Melinda, and Susan are my undergrad secretaries who worked overtime to make this meeting a success. Thanks, girls.) Transportation, Al Karlin, Don Holzworth, and Jay Youngs. Social Hour, Karen Blackburn, Mike McCloud, Bob Yeager, Don Holzworth, and Bob Bard, a group of non-herpetologists who survived the onslaught of a group of drunken herpetologists -- to you, the Croix de Guerre! Also thanks to two unique people who belonged to both groups: Al Karlin and George Labanick! Gophers, Kevin Crofton and Tom Hill. (You don't know what a gopher is? As in, "Kevin, gopher a Carousel and set it up in the Heritage Room." Projectionists, Jill Auburn and Lyn Branch. Art Exhibit, Dave Dennis and the others who helped.

We would like to thank the Vice President of Alumni Affairs, John Dolibois, of the original Miami University (not to be confused with the Florida imitation), and all other representatives of the host institution for providing the facilities and pleasant environment in which to hold this meeting.

We would like to thank Ed Maruska, Director of the Cincinnati Zoo, and David Jardine, Curator of Reptiles, for their invitation to the members of the Society to visit the Zoo to see and photograph this excellent collection of amphibians and reptiles.

The program has been a most successful one. We would like to thank Tom Uzzell and all of the participants in the Symposium on Reproductive Biology of Amphibians which was useful, educational and most of all,interesting. (In turn, Tom has asked me to thank Miami University for financial support and Doug and Shelly for help above and beyond that usually provided by the Local Committee. And I certainly appreciated the "Ev and Charlie Show" provided by the amphibiologists from time to time!) We should also like to express our appreciation of all of the contributed papers (even when we disagreed with them!).

We would like to thank all of the officers and members of SSAR for the support that has made the programs of the Society so imaginative and successful, especially: Max Nickerson, retiring editor of Herp. Review, who has struggled with increasing content, increasing costs, and limited budgets, and our Treasurer, Henri Seibert, who has kept the Society in the black (and the Board of Directors in the dark) these many years. Personally, I would like to offer special thanks to the single retiring board member this year for his outstanding service, to...uh.... the name seems to be misspelled...

Finally, few people realize the task the chairmanship of SSAR involves. It is not a figure-head position. Jim Vial has literally worked his coccyx off... (he has the X-rays to prove it!) in advancing programs of the Society. He deserves our whole-hearted thanks. We extend to him our appreciation for a job well done. (Thanks, Jim.)

And lastly, but not leastly, I'm sure we all would like to thank those who provided the social lubrication at the Social Hour at Hueston Woods: Fisher Scientific, Corning Glass, and one or more person or persons unnamed who would prefer to remain unnamed!

(Turning to Jim Vial): Dr. Chairperson, I move the unanimous acceptance of this report!

Jim Huheey, for:
Ron Brandon, Rich Montanucci

ENVENOMATION IN SNAKES AND ITS TREATMENT WITH ANTIVENIN

On 13 December 1974 at the Baltimore Zoo, a 1.5 m, 360 g Blanding's tree snake (Boiga blandingi) was bitten by a 1.8 m black mamba (Dendroaspis polylepis). The mamba delivered a single quick strike to the tree snake's dorsolateral surface, near midbody, at 0902 h. Within 15 min the bitten snake was in obvious distress, lying inertly on its side with mouth open. Since the tree snake appeared to be in extremis it was felt that little could be lost by administering antivenin. At 0935, five ml SAIMR Polyvalent Antivenin (Bitis, Dendroaspis, Hemachatus, Naja) was injected IP. The dosage was selected arbitrarily. There was no change in condition until 1510 h when the tree snake was observed in a normal position with mouth closed. By 1600 h, when observation was ended for the day, it was moving sluggishly and occasionally flicking its tongue.

On the morning of 14 December the snake was still generally inactive, but showed no other signs of distress. During the night it had ejaculated 2- 3 ml of semen, possibly as a result of pressure generated by the relatively massive injection of antivenin into the body cavity in the general area of the testes. Thereafter gradual improvement was indicated by increased activity, although food was refused on 17 and 19 December. On 7 January 1975, the snake fed for the first time since the bite and, a month later, was on a regular feeding schedule, apparently fully recovered.

Since spontaneous recovery may have occurred in this case it was decided to test this possibility by allowing the mamba to bite another tree snake and to withhold antivenin. Thus, a second B. blandingi, a larger female from the same clutch of eggs as the first, was selected. This specimen was 2 m and weighed 502 g. It was disfigured by a number of calcium deposits along the vertebral column but was otherwise in apparent good health.

On 19 December 1974, at 0922 h the mamba was induced to bite this snake. The mamba had not fed, nor, as far as is known, expended venom in any other way since the time of the first bite. A single quick strike was delivered to the same body area as in the first specimen. Symptoms of envenomation, immobility, lateral recumbency and open mouth, were noted at 0945. Irregular respiration, as observed by the opening and closing of the snake's glottis, continued until 1215 h, when all signs of breathing ceased.

The death of the second snake does not prove, but strongly indicates, that antivenin therapy was an effective factor in the survival of the first.

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TERRITORY AND HOME RANGE MAPPING FOR LIZARDS AND OTHER SMALL ANIMALS: A PHOTOGRAPHIC METHOD. --The estimation of lizard home range and territory sizes recently evoked considerable interest concerning sample size biases and area determinations after loci have been plotted (Milstead, 1971, 1972; Turner, 1971). Problems also arise at earlier stages of home range and territory size estimations when a decision must be made regarding the plotting of recapture, sighting, or defense loci. These records must allow areas to be calculated with a minimum of error and effort.

Traditionally, a grid system is established by staking the study area, mapping it on paper, and reproducing copies of the grid map. Recapture, sighting, or defense points are plotted on the grid maps. This method works well for many studies but is cumbersome for others. For example, a large patchy area which results in the patchy distribution of the experimental animals requires either a largely unused grid of enormous size or many small grids. Setting up a largely unused grid is inefficient and it may be very difficult if not impossible, to decide on locations for the small grids during the initial stages of the study. The grid system may also be awkward for an investigator using many areas for short periods of time. Staking each area requires time that might best be spent in other pursuits. Finally, grid systems invite inaccuracies because loci must be approximated on grid maps. Finer grids reduce error but can be difficult to establish and maintain.

While working on a study relating food abundance to territory size in the iguanid lizard Sceloporus jarrovi (Simon, in press), I encountered several of the above problems and shifted from a grid system to a photographic method. Territory defense points were plotted on Polaroid photographs. Photos were taken as needed and filed in a field notebook under the assigned number of each territorial animal. A maximum of 3 photos encompassed each lizard's territory; the scale used varied from photo to photo but allowed significant landmarks such as boulders and trees to be individually recognized. Since the scale varied, all distances were measured in the field by referring to the photos.

The disadvantages of this system are that home range or territory overlaps are not obvious and that basic measurements must be made in the field. I do not suggest the photographic method for all studies; the ecological questions each investigator asks must determine which method is best.

Funding during the development of this method came from the Chancellor's Patent Fund of the University of California at Riverside and field work was done at the American Museum of Natural History's Southwestern Research Station, Portal, Arizona.

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COURTSHIP-LIKE BEHAVIOR OF IMMATURE TURTLES

There are few references to courtship-like behavior in young turtles in the herpetological literature. Thomas (1969) recorded it for young Testudo hermanni and Cagle (1955) reported titillation for hatchling Graptemys kohni, Pseudemys scripta, and P. floridana, and a Graptemys flavimaculata which "was in its first season of growth" but "retained many hatchling characteristics." He suggested that the premating activity display in immature turtles might serve as a means of identification since he observed it only when a turtle encountered a foreign organism for the first time.

On 21 September 1971 titillation was observed between two juvenile Pseudemys scripta elegans. The sliders had shared the same aquarium since their acquisition from a commercial dealer in the summer of 1970. Both turtles were about 5 cm in carapace length, but one was slightly larger than the other. The larger turtle (a male) approached the smaller one (sex undetermined), extended its forefeet, and vibrated its nails against the other's head. The smaller turtle attempted to turn and swim away, but the larger scripta again took a position facing its cagemate, and performed another titillation bout. On this occasion the smaller chelonian did not seek escape, but instead returned the titillation action. Then both turtles turned and swam in opposite directions. Neither turtle was ever observed to "court" two Podocnemis unifilis or a Chelydra serpentina in the same aquarium.

The observation of titillation between immature turtles which were familiar with each other suggests that courtship-like display in juvenile emydids may have a sexual significance in addition to serving an identification purpose. Perhaps in hatchlings (i.e., those turtles with less than one growing season completed) the primary purpose of such behavior is to serve as a means of communicating information about the turtle's environ, while in older juveniles the inception of hormonal release triggers such action. Cagle (1950) reported that male P. s. elegans may reach sexual maturity in less than two growing seasons; consequently it seems plausible that androgens may be released while a male turtle is still quite young (less than three years old). Therefore, both sensory and sexual releasers could be present at the same point in a turtle's development. The validity of this explanation is suggested by an instance on 23 July 1972, when the larger P. s. elegans noted above approached a food item (a small bluntnose minnow, Pimephales notatus) and vibrated its claws against the fish before devouring it. Although the reptile's main diet consisted of fish, most of the food was presented after it had been frozen and thawed; the Pimephales was fresh, and could have been a novel enough stimulus to elicit the "courtship" display, even though the turtle had been fed fresh material on a few previous occasions.

Investigations aimed at determining when changes leading to sexual maturity in reptiles actually begin, coupled with studies on wild juvenile turtles to determine if, and under what conditions, they display the courtship patterns, would be very helpful in explaining precopulatory behavior of immature captive emydids.

Thanks are due Drs. P. W. Smith and L. M. Page for critically reading the manuscript. I also extend my appreciation to H. W. Greene for providing comments and bringing my attention to a pertinent literature reference.

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ESCAPE BEHAVIOR OF THE SOUTHERN PLAINS SKINK

The Southern Plains Skink Eumeces septentrionalis obtusirostris is normally found among leaves and under logs in oak-woodland communities in Oklahoma (Webb, 1970). During May 1975 I observed an interesting escape behavior of these skinks in a grassy, open field on the Oklahoma Baptist University campus. The field surrounds a one-acre pond containing mats of aquatic vegetation and a muskrat population. Cattle graze the field and cave in the muskrat burrows which results in holes 15-40 cm in diameter, up to 3 m long and 15-30 cm in depth surrounding the pond.

Southern Plains Skinks were observed disappearing into the holes and burrows. When a skink was disturbed and prevented from entering a burrow, it usually ran onto the matted vegetation in the pond. Skinks showed no hesitation in entering the water, running onto surface vegetation or even swimming under the aquatic vegetation. Some skinks were located over 2 m from shore.

Taylor (1936) reported that two E. s. obtusirostris took to water to escape when disturbed. Similar behavior has been reported for Scincella lateralis (Collins, 1974; Smith, 1946), Eumeces inexpectatus and Eumeces multivirgatus gaigeae (Smith, 1946).

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An Eumeces septentrionalis utilizing aquatic vegetation as an escape medium.

THAMNOPHIS ELEGANS CAPTURES SOREX EMARGINATUS-- Small mice, especially Microtus, are known food items of Thamnophis elegans (Fitch, California Fish and Game, vol. 27, 1941; White and Kolb, Copeia, No. 1, 1974) as well as of Thamnophis sirtalis (Fitch, Univ. Kansas Publ. Mus. Nat. Hist., vol. 15, 1965). However, the use of shrews as food by garter snakes is seldom reported; Hamilton (Amer. Midl. Nat., vol. 46, 1951), found Blarina brevicauda as a food item of T. sirtalis, and Grinnell, Dixon, and Linsdale (Univ. California Publ. Zool., vol. 35, 1930) noted T. elegans eating an unidentified shrew. Since the food habits of T. elegans in Mexico are little known, the following snake-shrew relationship seems worthy of record.

On 4 August 1975, our field party made a stop in montane pine-oak habitat in the Sierra Madre Occidental (at 2900 m) about 10 km (airline; approximately 19 km by winding mountain road) west of San Juan Capistrano, Zacatecas. This locality in west-central Mexico is just at the boundary between southwestern Zacatecas and extreme southern Durango and less than 5 km north of where the boundaries of these two states meet that of Nayarit.

At about 1630 hours we were looking for vertebrate signs in mixed grass and forbs along the border of a cornfield being cultivated by a family of Tepehuan Indians. When probing a small pile of brush, a garter snake, T. elegans, moved out from the opposite side of this debris. In its mouth securely held in a crosswise position was a shrew, which proved to be a lactating female Sorex emarginatus Merriam. The prey was covered with snake saliva from head to the hips. Thus, it was presumed that our presence had prompted the garter snake to regurgitate the partly-swallowed shrew, then pick it up and attempt to escape. Both specimens were preserved; the snake (RGW no. 6386) is a female with a body length of 482 mm in the R.G. Webb Collection and the shrew (MSU no. 23482) in The Museum at Michigan State University. The authors appreciate the field assistance of Stuart E. Knapp of Oregon State University and Mary W. Baker, and the cooperation of Mario Luis Cossio G., Director General de Fauna Silvestre, Departamento de Conservacion, Estados Unidos Mexicanos, for making permits available for our field studies.

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Herpetological Circulars, edited by George R. Pisani (Biology Dept., Univ. of Kansas, Lawrence, KS 66045) publishes miscellaneous manuscripts which will be of value to the general herpetological community and segments of the public-at-large. Titles published thus far include A Guide to Preservation Techniques for Amphibians and Reptiles (English and Spanish editions), Collections of Preserved Amphibians and Reptiles in the United States, and A Brief Outline of Suggested Treatments for Diseases of Captive Reptiles. Persons having manuscripts or ideas for manuscripts which are 1) between 15 and 80 typed pages (dbl. space) long, not counting illustrations, 2) of general interest, and 3) do not present research articles better included in The Journal of Herpetology are encouraged to contact the Circulars editor.

PREDATION ON IGUANID LIZARDS BY THE ROUNDTAIL CHUB, GILA ROBUSTA GRAHAMI, AT FOSSIL CREEK, ARIZONA

During analysis of stomach contents of Gila robusta grahami, it became apparent that this species was an opportunistic feeder like other members of his genus (Venicek and Kramer, 1969). They consume both aquatic and terrestrial organisms. Two terrestrial iguanid lizards (Urosaurus ornatus and Sceloporus clarki) were taken during the 17 October 1975 collection of fish at Fossil Creek, Gila County, Arizona. The adult Urosaurus was in the stomach of a chub measuring 181 m in total length , and weighed 61 gm, while the fish that consumed the hatchling Sceloporus was 169 mm in length and weighed 42 gm. The tree lizard measured 37 mm SVL and weighed 2.1 gm while the Clark's spiny lizard was 39 mm SVL and weighed 3.2 gm.

The occurrence of lizards as food items of fish seems to be extremely rare since only two lizards were found in 453 stomachs from Fossil Creek chubs. It seems probable that larger fish would take lizards if available in their microhabitat since most fish are omnivores (Minckley, 1973).

According to Stebbins (1972) both Urosaurus and Sceloporus may be found in riparian situations which would increase the chances of a lizard entering the water. Lizards may enter water to avoid predators (Dillon and Baldauf, 1945) or possibly in search of "preferred food items". Since the Sceloporus had recently-ingested dragonflies in its stomach it is possible that it had been feeding along the stream when it either fell in or was actively taken by the fish.

ACKNOWLEDGEMENTS

I thank Dr. Oliver Johnson for lizard identification, assisting in the literature search, and helpful suggestions. Also I thank Mr. C.O. Minckley for helping with the October collections and supplying helpful suggestions. The Arizona Public Service and the Forest Service provided access to Fossil Creek.

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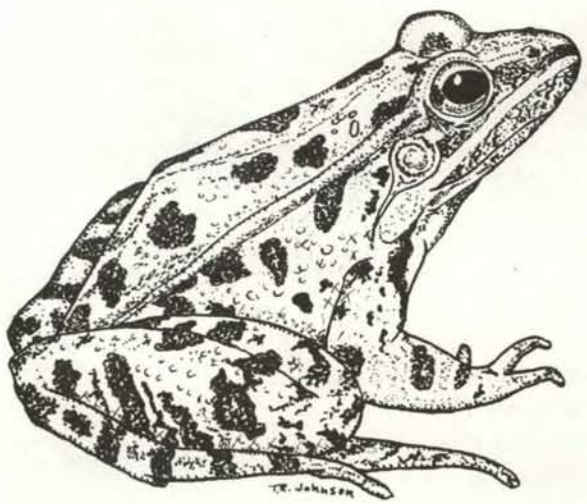
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Southern Leopard Frog

LAMPROPELTIS TRIANGULUM ELAPSOIDES

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Lampropeltis triangulum elapsoides. In September 1974, a gravid scarlet king snake, *Lampropeltis triangulum elapsoides* (ca. 425 mm snout-vent) was collected near Miami, Dade County, Florida. On 8 October 1974, it laid 5 eggs. When first noticed, three of the eggs had been deposited. The last two eggs were laid at 17 and 48 min. intervals. The five eggs were 23.2 - 30.2 mm (mean 27.3 mm) in length, and 9.6 - 11.8 mm (mean 10.8 mm) in diameter. Their weights ranged from 1.5 - 2.3 g (mean 1.9 g).

The eggs were incubated in a plastic box containing moist substrate (Vermiculite) at 25 - 28 C. By 13 November, 4 eggs had spoiled and appeared to have been infertile. On 7 December, the remaining egg was found to have increased slightly in size and weight. On 12 December, the shell seemed very thin and movements of the developing young were observed. Several days later the egg collapsed and was opened. It contained a fully-developed dead snake, which was ca. 150 mm total length.

This clutch of eggs was produced at a late date. Reproductive data for this subspecies indicates that egg laying occurs in June - July and hatching in August - September (Williams, K. L. 1971. Systematics of the colubrid snake *Lampropeltis triangulum* Lacepede. Univ. Microfilms, 6617, 371 p.; Groves, J. D., and P. S. Sachs. 1973. Eggs and young of the scarlet king snake, *Lampropeltis triangulum elapsoides*. J. Herp. 7(4): 389-390). Perhaps, in the southern portions of its range, the scarlet king snake produces more than one clutch of eggs in a season or some intrinsic or extrinsic factor forced this individual to reproduce aberrantly.

OWL PREDATION ON AMBYSTOMA TIGRINUM

A pellet taken under the perch of a Great Horned Owl (*Bubo virginianus*) from six miles north of Ogallah, Trego County, Kansas, 20 July 1975 by J. A. Holman, contained the skeleton of an adult *Ambystoma tigrinum*, presumably the subspecies *A. t. mavortium* (Collins, 1974). The skeleton was identified using the criteria of Holman (1975, p. 51). The pellet also contained beetle and mouse remains. This record is interesting in the light of numerous *Ambystoma tigrinum* fossils from North American Pleistocene caves and rock ledges, as it suggests the possibility of transportation there by owls.

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EARLY EGG DEPOSITION BY THE SOUTHERN BLACK RACER, *COLUBER CONSTRICTOR PRIAPUS*

A female southern black racer was captured on 11 March 1975 six miles south of Bradley Junction, Polk Co., Florida. This snake, measuring 910 mm (S-V), deposited a clutch of 14 eggs in captivity 5 days later on 16 March 1975. The eggs were all in excellent condition and averaged 32.4 mm in length (28.7-34.5) and 21.3 mm in width (18.7-22.6). Incubation was achieved in a plastic box filled with sphagnum moss at 26-27°C and 9 of the 14 eggs hatched on 21 June 1975. The eggs were maintained in my home without the use of an incubator or environmental chamber. The seven male hatchlings had an average S-V length of 217 mm (182-258) and an average total length of 290 mm (246-345). The two female hatchlings had an average S-V length of 230 mm (212-248) and an average total length of 305 mm (289-322).

The clutch deposition by this individual was quite early, considering that Wright and Bishop (1915), Cagle (1942) and Rossman (1960) have recorded 19 June, 10 June and 1 June, respectively, as dates of laying for *Coluber constrictor priapus*. The earliest record for any snake of this species is for *C. c. flaviventris* with a laying date of 1 June (Ortenberger, 1928).

The early clutch deposition is coupled with an incubation time of 97 days, more than one and a half times as long as previous records. Fitch (1963) has shown that previously the longest incubation period for *C. c. priapus* is 59 days and the longest for any snake of this species is 73 days in *C. c. stejnegerianus*.

It is conceivable that the eggs would normally have been held until a later date if the snake's capture had not intervened. Fitch (1963) states that gravid females produced a clutch of eggs within a few days after having been brought into captivity. The occurrence described indicates that the eggs are ready for deposition at least a few days in advance of the actual laying date which gives the female sufficient latitude in locating a suitable nest site. This also appears to suggest that *C. c. priapus* has the potential for producing more than one clutch per year, although Fitch (1970) did not report evidence for this in *Coluber*.

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NOTES ON EGGS AND HATCHLINGS OF XENOCALAMUS BICOLOR LINEATUS ROUX FROM SOUTH AFRICA

The genus Xenocalamus belongs to the African colubrid subfamily Aparallactinae, and currently contains 5 species and 9 forms (Broadley, 1971). Snakes of the genus are small (although one species, X. michelli, reaches a length of over 1 m), fossorial, and characterized by an elongate body, small head and obtusely to acutely pointed snout from which their popular name, quill-snouted snakes, is derived.

Knowledge concerning reproduction in the genus is sparse and restricted to egg measurements (X. bicolor lineatus lays three to four eggs measuring up to 26 x 6 mm), FitzSimons, 1962; X. transvaalensis "contained two eggs measuring 28 x 6 mm", Broadley, 1971). We report here the first record of incubation of Xenocalamus eggs, with details of size, weight and lepidosis of hatchlings.

A female Xenocalamus bicolor lineatus Roux of record length (505 + 34 mm), collected in the vicinity of Celine, northern Transvaal, South Africa, was received at the Transvaal Snake Park on 13 December 1974. On 7 January 1975 the female laid four eggs which were ivory-colored, smooth-shelled and elongate in shape, with maximum lengths of 45, 45, 40 and 47 mm. These lengths are almost double those recorded for the subspecies by FitzSimons (1962). The diameters of the eggs were not recorded, but were approximately twice the diameter of the spent female, i.e., approximately 15 mm.

The eggs were incubated on moist paper towels in a Vosmar incubator maintained at 30-32°C. The first egg hatched on 3 March 1975, two more hatched on the next day, and the final hatchling emerged on 5 March 1975, giving an incubation period of 55-57 days. Sex ratio of the young was 1:1. Details of size, weight, and scutellation of the mother and hatchlings are shown in Table 1. All had divided anal scales. Ventrals were counted by the Dowling (1951) method. The subcaudals are divided and counts, recorded for both sides of the tail, begin with the first scute in contact with its fellow on the midline and exclude the terminal spine. One female hatchling (No. 2) had confused subcaudal scalation with paired, unpaired, fused and divided scutes, resulting in a large difference between counts on the right and left side of the tail. Scutellation details not recorded in Table 1., i.e., dorsal scale rows, head plates, etc., are as described for the subspecies X. b. lineatus by Broadley (1971).

Coloration of hatchlings was similar to that of the mother, and to that described by Broadley (1971) for southern populations of X. b. lineatus (Waterpoort, northern Transvaal), i.e., dorsal stripe broad (12 scales wide). However, the yellow lateral coloration was considerably reduced in the mother and absent in the hatchlings. No intraspecific color variation as described in X. b. bicolor (Broadley, 1971) was evident.

The hatchlings have low ventral counts, those of the two males being in the lower range of X. b. lineatus counts (198-234 in ♂♂). However, ventral counts in the two females are substantially lower than for X. b. lineatus (221-248 in ♀♀), falling into the range of the subspecies X. b. australis (205-216 in ♀♀). Celine is at the southern limit of the distribution of X. b. lineatus and borders the range of X. b. australis. It is thus possible that the low ventral counts of the female hatchlings reflects intergradation between the two subspecies. Lateral yellow coloration is absent in X. b. australis and the four hatchlings, although in the latter this may have developed later. The upper labial counts of the hatchlings and mother are typical of X. b. lineatus (i.e., six, the third and fourth entering orbit) and show no evidence of approaching the condition found in X. b. australis (i.e.,five, the third entering orbit).

Xenocalamus apparently prey exclusively on amphisbaenians (Broadley, 1971) and it thus proved impossible to maintain the mother or young. They were thus sacrificed for serological and chromosomal analysis, the results of which will be presented elsewhere (Branch, 1975). The mother and two of the hatchlings have been placed in the herpetological collection of the Transvaal Museum, Pretoria (TM 46130-2).

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Table 1. Size, weight and scutellation details for Xenocalamus bicolor lineatus mother and hatchlings.

	Mother	Hatchlings			
		1	2	3	4
Snout-vent length (mm)	505	182	183	185	181
Tail length (mm)	34	16	17	19	20
Weight (g)	----	2.23	2.24	2.45	2.31
Sex	F	F	F	M	M
Ventrals	226	215	209	204	206
Sub-caudals*	27/27	28/29	24/32	35/35	34/35
Umbilical scar (ventrals)	-----	197-200	184-187	187-190	188-191

*Right side of tail recorded first

Northeastern Field Naturalists' Society

The NORTHEASTERN FIELD NATURALISTS' SOCIETY is an organization of professional, student, and amateur naturalists devoted to pure ecological research and biological conservation studies. Especial attention is given by the Society to the study of the natural animal and plant populations and communities of the northeastern United States and the influences of urbanization on wildlife in general. Although originally founded as the Long Island Herpetological Society in 1965, the NEFNS has evolved into a multidisciplinary organization that now consists of herpetologists, entomologists, ornithologists, botanists, mammalogists,and naturalists with primary interests in other fields. All interested persons are encouraged to join us.



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A major aspect of the Society is its publications, and membership includes a subscription to all of these. With the belief that a well-rounded series of publications is better than a single journal, the Society provides its members with one of the most diversified series of natural history periodicals. Four regular periodicals are issued by the NEFNS, and no less than one number of each is published per year. The contents of these publications are so diverse that both long-established professional and beginning amateur naturalists will find much of value. All the back issues of current Society publications are available, and a price list will be furnished on request.

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The Pitch Pine Naturalist is the less formal journal published by the NEFNS. It functions as a means for members to publish primarily descriptive, nonanalytical notes and articles on the biota of the Northeast. Society announcements, book reviews, annual membership listings, membership requests, and other informal items are also included. Through the inclusion of their specialized ecological and regional natural history interests in the annual membership listing, members are able to stimulate appropriate contact with others.

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The *Conservation, Regional Planning, and Public Information Publication Series* functions to bring important issues, particularly those relating to biological conservation in the Northeast, to the attention of ecologists, planners, conservationists, and the general public. Each number of this series concerns a specific aspect of biological conservation or general natural history(for example, a number may be devoted exclusively to the biotation of a region threatened with destruction by urbanization). Each number of the series is written in a biologically rigorous manner but is specifically designed to be understandable to the intelligent layman. Endangered natural populations and communities, alternative planning approaches, and sound biological conservation practices are emphasized. This series also serves to present important regional conservation issues that may otherwise remain overlooked by most biological conservationists and the general public. Although all members receive the series as part of their membership in the NEFNS, appropiate publicity is given to individual numbers, which are offered for sale to the general public.

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Please send membership dues, subscription fees, and inquiries to the following address:

Northeastern Field Naturalists' Society
Post Office Box 6
Central Islip, Long Island, New York 11722



ANNOUNCEMENT

The Smithsonian Foreign Currency Program, a national research grants program, offers opportunities for support of research in Burma, Guinea, India, Pakistan, Poland (through 1976), and Egypt in the following disciplines:

Archeology and related disciplines (including Anthropology)
Systematic and Environmental Biology, Astrophysics and Earth Sciences, and Museum Programs

The program's appropriation for fiscal year 1977 totals $2,500,000 equivalent in the currencies of the above-listed countries. Grants in those currencies are awarded to American Institutions for the research of senior scientists. Collaborative programs involving host country institutions are welcome and frequently required. Awards are determined on the basis of competitive scientific review. The deadline for submission is November 1 annually. For further information write the Foreign Currency Program, Office of International Programs, Smithsonian Institution, Washington, D.C. 20560

"The Florida population of the American Crocodile, down to about a dozen breeding females and about 200 individuals, has been placed on the U.S. Dept. Interior's endangered species list. A Recovery Team has been appointed to develop a plan to restore this population to a secure status as a component of the South Florida ecosystem. Team members are Howard (Duke) Campbell (Team leader), Tommy Hines, Rich Klukas, James Kushland and John Ogden. The team is anxious to locate, 1) confirmed sightings of crocodiles out of the Everglades National Park in the last 5 years, and 2) all captive crocodiles which can be documented to have come from south Florida. Anyone with any pertinent information should write to Duke Campbell at: National Fish and Wildlife Laboratory, 2820 E. University Avenue, Gainesville, Florida 32601."

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IN THE NEWS

The Florida game and fish commission has voted in principle to end a 10 year old ban on harvesting alligators for their hides. It is estimated that, in the past 10 years, the number of alligators has grown from an endangered level to over ½ million. Game officers receive over 10,000 alligator complaints a year and there have been six alligator attacks on humans in Florida in the last two years, including one fatal attack.

Milwaukee Journal

In Munich, Germany, city officials have come to the rescue of frogs that normally would get wiped-out trying to cross the Autobahn. A "help-a-frog-across-the-road" campaign has begun. The frogs are now being caught in buckets sunk in the ground and then transported across the Autobahn by volunteers. In addition, city officials hope "to build several tunnels under the highway at points corresponding to the centuries-old routes taken by the toads and frogs".

UPI in Milwaukee Sentinel

With financial assistance from the United Nations Development Program, pilot programs for crocodile farms are being organized in India. It has been estimated that one 500-mile area in West Bengal now earns $40,000 annually from forest products could yield as much as $12 million if formed into a crocodile preserve.

UPI in Milwaukee Journal

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LOUIS J. PISTOIA (1917-1976)

Louis Pistoia, curator of reptiles at the Columbus (Ohio) Zoo, died of cancer on 9 May at the age of 58. Pistoia had been in charge of the reptile collection at Columbus since 1958, having previously been with the Staten Island and Bronx Zoos. During his tenure at Columbus he built the herpetological collection into probably the largest one in the United States, both in terms of the number of specimens and of species, rivalling the reptile collections of the larger zoos in New York, Philadelphia and Chicago. He also designed the innovative Reptilia-Amphibia Hall at the Columbus Zoo which was opened in 1968; this building was described in detail in an article by Pistoia in Herpetological Review, vol. 1, no. 3, pp. 4-6, 1968.

He was particularly well known for his many reptile longevity records, especially those for snakes, and for his ability to maintain a wide variety of species including many amphibians and other forms that are secretive, nocturnal or otherwise difficult to display. He was also successful in breeding programs and it is believed that more species of snakes were bred at the Columbus Zoo than at any other collection. Several species, in fact, have been captive bred there for four or five generations. In 1973, Pistoia received the Robert Bean Award from the American Association of Zoological Parks and Aquariums, specifically for breeding and raising Jamaican boas.

Cornell University announces SUMMER FIELD COURSES IN HERPETOLOGY AND ICHTHYOLOGY - June 29-August 12, 1977 . Also offered will be MAMMALOGY, ORNITHOLOGY, PLANT ECOLOGY, GENERAL ECOLOGY. For information write to Simon A. Levin, Chairman, Section of Ecology and Systematics,235 Langmuir Laboratory, Cornell University, Ithaca, NY 14853.

REGISTRY FOR REPTILE PATHOLOGY

Department of Veterinary Science
University of Maryland
College Park, Maryland
20742

PURPOSE: To broaden the field of Comparative Pathology by establishing a center where disease processes in reptiles will be studied and histopathological finding catalogued and maintained on file. The Department of Veterinary Science will also offer a service for diagnosis of disease problems on individual research animals or colony situations. A detailed report in findings will follow the submission of tissues or specimens.

PROCESSING: The attached necropsy sheet should be completed and history relevant to the case should be included. When possible, Kodachrome slides should be taken of all gross material. Tissues should be placed in buffered formalin for light microscopy. In addition, tissue samples should be placed in 2.5% glutaraldehyde for electron microscopy. Biopsy materials should be handled in the same way. If possible, a sterial swab (Culturete, Scientific Products) of the affected area should be included for microbial isolation. Representative samples from all major organ systems should be placed in separate containers of glutaraldehyde and formalin. Often tissues that fail to show gross lesions are of value for light and electron microscopic evaluation. All tissues should be as fresh as possible and should not be frozen.

WHERE TO SEND:

Dr. Elliott Jacobson
Dept. of Veterinary Sciences
University of Maryland
College Park, Maryland 20742
(Phone: 301 454-4651)

John W. Ferner, Asst. Prof. of Biology, Franklin & Marshall College, Lancaster, Pa. 17604 is preparing a manuscript on marking techniques for amphibians and reptiles and requests receipt of any unpublished methods.

Stephen Ayala, Helen Chin and John Simmons will be surveying Colombian lizard populations for malaria infections from July 1976-December 1977. Saurian reference collections will be deposited in Bogota, Cali and Medellin museums. An illustrated field guide to the lizards of Colombia is also planned. Participating institutions include the Universidad del Valle Medical School in Cali, INDERENA (Colombia's Natural Resources Institute), Peace Corps, University of Kansas Museum of Natural History, COLCIENCIAS (Colombian National Science Foundation) and the Tulane University International Center for Medical Research.

The small herpetological collection of the Museo Nacional de Costa Rica has recently been transferred to the Museo de Zoologia, Universidad de Costa Rica. The material is currently under study in order to ascertain its historical value. I would appreciate knowing of correspondence or other references to this material which may aid in deciphering partially destroyed labels, information regarding "lost" types, etc. The types of Haptoglossa pressicauda, Trimetopon viquezi and Pogonaspis ruficeps have not been found.

DOUGLAS C. ROBINSON
Escuela de Biologia
Universidad de Costa Rica
Ciudad Universitaria "Rodrigo Facio"
Costa Rica

Stanley Dyrkacz is involved in an investigation of pattern striping in Lampropeltis calligaster. Anyone with information as to the disposition of specimens (especially living specimens for breeding purposes) should contact: S. Dyrkacz, Syntex Laboratories, 18 N. State Street, Elgin, IL 60120.

FEDERAL WILDLIFE PERMIT OFFICE ESTABLISHED

The U.S. Fish and Wildlife Service has announced the establishment of a new office "to implement an international treaty regulating commercial trade in and movement of the world's endangered wild plants and animals."

It will also be the task of the Federal Wildlife Permit Office to "ease the plight of scientists, zoos, and others who engage in activities involving federally protected wildlife by reducing red tape and simplifying the permit issuing process while maintaining needed controls...The Federal Wildlife Permit Office will first work toward coordination permits issued within the Fish and Wildlife Service, and later may become the coordinating body or clearing house for the issuance of all Federal permits involving wildlife."

The new office will be headed by Rick Parsons, an attorney. The address of the new office is:

U.S. Fish and Wildlife Service
Federal Wildlife Permits Office
Washington, D.C. 20240
Telephone 202-343-8916

CORNELL UNIVERSITY has available a position for a curatorial associate in Ichthyology and Herpetology. Experience with a systematic collection and formal training in Herpetology or Ichthyology, preferably both, is required. Applicants should send resumes and names of three referees to F. Harvey Pough, Associate Professor of Herpetology, Section of Ecology and Systematics, Cornell University, Ithaca, New York 14853.

CHANGE OF ADDRESS

JOSEPH C. MITCHELL
Grad. Program in Ecology
408 10th Street
Univ. of Tennessee
Knoxville, TN 37916

CAUDATA

DESMOGNATHUS OCHROPHAEUS (Mountain dusky salamander). U.S.A., Vermont, Windsor Co., Stockbridge; 21 April 1962; J. D. Lazell, Jr. Museum of Comparative Zoology, MCZ 37796. First record for New England (Tilley, 1973, Cat. Amer. Amph. Rept., 129). Dr. Barry Valentine (in litt) acknowledged notification of the specimen's existence in 1962. Submitted by JAMES D. LAZELL, JR., Scientific Staff, Massachusetts Audubon Society, Lincoln, MA 01773.

GYRINOPHILUS PORPHYRITICUS (Spring salamander). U.S.A., Georgia, Upson Co., 11.7 km ESE Woodbury on Pine Mountain; 11 October 1975; Auburn University Museum, AUM 24032. Extends known range 143.6 km S from Bartow, Clark and Dekalb Cos., GA (Brandon, 1966, Illinois Biol. Monogr., 35:1-86; Reese, 1950, Chicago Acad. Sci. Nat. Hist. Misc., 63:1-7). Pine Mountain and adjacent Oak Mountain are discontinuous, parallel ridges isolated from areas of high relief to the north. This may indicate that suitable upland stream habitats are lacking in the intervening area. These ridges extend approximately 91.4 km ending 36.5 km north of the Fall Line. Submitted by THOMAS W. FRENCH, Dept. of Zoology-Entomology, Auburn University, Auburn, AL 36830.

PSEUDOTRITON MONTANUS DIASTICTUS (Midland mud salamander). U.S.A., Tennessee, Franklin Co., Sewanee; 14 April 1959; J. D. Lazell, Jr. Museum of Comparative Zoology, MCZ 31887 and collection of the University of the South, Sewanee, Tennessee, two untagged. Locality of within the range shown by Conant (1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston) but well outside that mapped by Martof (1975, Cat. Amer. Amph. Rept., 166). Specimens are typical of the subspecies diastictus, relegated to synonomy without explanation by Martof (op. cit.). Submitted by JAMES D. LAZELL, JR.

SALENTIA

RANA CATESBEIANA (Bullfrog). Mexico, Estudo de Baja California Sur, San Ignacio; 21 January 1974; D. A. Mullen. University of San Francisco Museum of Vertebrate Zoology, 5010-5017. Reported introduced by Americans in 1970. Now common in most local stock ponds . Extends range approximately 520 km S Colorado River drainage. Submitted by DAVID A. MULLEN, Dept. of Biology, University of San Francisco, San Francisco, CA 94117.

TESTUDINES

KINOSTERNON FLAVESCENS FLAVESCENS (Yellow mud turtle). Mexico, Tamaulipas, 7.7 km NW Manuel, Hwy 80; 24 Dec. 1973; M. E. Seidel. University of New Mexico, Museum of Southwestern Biology, UNM 30809. Extension of range below Tropic of Cancer and first record in the southern coastal plain of Tamaulipas. This locality is in a vegetation zone transitional between grassland and tropical forest (Leopold, 1950, Ecology 31(4):507-518) and represents a new ecological association for this species. Marshes and drainage ditches are abundant in the area. K. cruentatum was collected 20 km SE of the above locality and is probably sympatric with K. flavescens in this part of its range. Submitted by MICHAEL E. SEIDEL, Dept. of Biological Sciences,Marshall University, Huntington, WVA 25701.

SAURIA

OPHISAURUS COMPRESSUS (Island glass lizard). U.S.A., Florida, Taylor Co., 21 to 27 km W Perry on US 98; 29 May 1975; J. S. Godley and R. W. McDiarmid.

R. W. McDiarmid and J. S. Godley. University of South Florida, JSG 2785-2788. New county record; locality lies 196 km NE of St. George Island record (Blaney, 1971, Herpetologica, 24:418) and 222 km NW Cedar Key record(McConkey, 1954, Amer. Midl. Nat., 51:146). The new records suggests that the St. George Island population is not relictual (Blaney,op.cit.; Conant'75,A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co., Boston) but rather the distribution of O. compressus may be continuous in the large tracts of suitable pineland habitat of this region. Submitted by J. STEVE GODLEY, Dept. of Biology, University of South Florida, Tampa, FL 33620.

SERPENTES

CEMOPHORA COCCINEA COPEI (Scarlet snake). U.S.A., Arkansas, Izard Co., 18.3 km W Melbourne; 13 May 1971; W. Byrd and E. L. Hanebrink. Arkansas State University, ASU 1293. Sharp Co., 5.2 km W Cave City; 3 July 1974; W. Byrd and E. L. Hanebrink. ASU 1294. Extends range in the Ozarks of northcentral Arkansas. These records fill the gap between previous collected specimens in Arkansas and the isolated records of Nickerson (1967, Herpetol., 23:74) and Williams and Wilson (1967, Tulane Stud. Zool., 13:103-124). Submitted by WILLIAM BYRD and EARL L. HANEBRINK, Division of Biological Sciences, Arkansas State University, State University, AR 72467.

DIADOPHIS PUNCTATUS ARNYI (Prairie ringneck snake). U.S.A., Oklahoma, Lincoln Co., 3.2 km NE Aydelotte; 1 March 1975; J. Short and J. Black. Oklahoma Baptist University, Webster Natural History Museum, WNHM 101. New county record and completes range to include all counties in central Oklahoma (Webb, 1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Submitted by JEFFERY HOWARD BLACK and JEFFERY SHORT, Dept. of Biology, Oklahoma Baptist University, Shawnee, OK 74801.

HETERODON NASICUS GLOYDI (Dusty hognosed snake). U.S.A., Arkansas, Polk Co., Skyline Drive on top of Rich Mountain at western boundary of Queen Wilhelmina State Park; 27 June 1975; D. B. Means, J. B. Atkinson, G. H. Means. Florida State Museum collection, UF/FSM-34, 807. First state record for species; extends range (by disjunction?) about 391.5 km from western Oklahoma or northeastern Texas (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co.). Submitted by D. BRUCE MEANS, Tall Timbers Research Station, Route 1, Box 160, Tallahassee, FL 32303.

SEMINATRIX PYGEA PALUDIS (Carolina swamp snake). U.S.A., South Carolina, Chesterfield Co., Carolina Sandhills National Wildlife Refuge, 12.4 km W McKennon; 6 Sept. 1975; J. S. Garton, B. L. Sill, L. Olmsted. W. Palmer. North Carolina State Museum, NCSM 15893. Extends known range west into the inner Coastal Plain in northern South Carolina. Submitted by JOHN S. GARTON and BEN L. SILL, Civil-Environmental Division, Duke Power Company, Box 2178, Charlotte, NC 28242.

STILOSOMA EXTENUATUM (Short-tailed snake). U.S.A., Florida, Highlands Co., 12 km S Lake Placid; 6 October 1975 and 15 April 1976; W. M. Masters and J. F. Douglas. Archbold Biological Station, uncataloged. First records for county; extend known range 78 km SW of previous southernmost locality (Brimley, 1910, Proc. Biol. Soc. Wash., 23:9-18). Habitats: sand pine scrub and slash pine-turkey oak woods. Submitted by JOHN F. DOUGLASS, Archbold Biological Station, Route 2, Box 180, Lake Placid, FL 33852.

STORERIA DEKAYI TEXANA (Texas brown snake). U.S.A., Oklahoma, Woodward Co., 9.7 km NW Woodward on US Hwy 183-270; 18 August 1975; C. J. and J. K. McCoy. C. J. McCoy. Carnegie Museum 60495. New westernmost record in Oklahoma(Webb, 1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Submitted by CLARENCE J. McCOY, JR., Carnegie Museum, 4400 Forbes Ave., Pittsburg, PA 15213.

THAMNOPHIS RADIX HAYDENI (Western plains garter snake). U.S.A., Oklahoma, Woodward Co., 6.5 km NW Woodward on US Hwy 183-270; 18 August 1975; C. J. and J. K. McCoy. C. J. McCoy. Carnegie Museum 60462. Eastward range extension, first record outside panhandle in Oklahoma (Webb, 1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Submitted by CLARENCE J. McCOY, JR.

TROPIDOCLONION LINEATUM (Lined snake). U.S.A., Oklahoma, Harper Co., 33.4 km N Woodward (Woodward Co.) on St. Hwy 34; 16 August 1975; C. J. and J. K. McCoy. C. J. McCoy. Carnegie Museum 60465. Fills distributional gap between Kingfisher Co. to the east and the Black Mesa area to the west. (Webb, 1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Submitted by CLARENCE J. McCOY, JR.

OPHEODRYS VERNALIS BLANCHARDI (Western smooth green snake). U.S.A., Iowa, Story Co., 4.1 km SW Gilbert (SW¼, S18, T84N, R24W); 25 Aug. 1974; W.F. Hollander; Iowa St. Univ. Collection, ISU 2880. Using color standards of Ridgeway (1912, Washington, D.C., 1-43), supralabials, chin and venter light buff in live specimen. Above supralabials, head showed an abrupt transition to buffy brown. First scale row tilleul buff darkening to buffy brown by fourth scale row. Carroll Co., Coon Rapids; July 1939; Iowa St. Univ. Collection, ISU 432. Preserved specimen is grey-brown, similar to preserved specimen described by Grobman (1941, Misc. Pub. Mus. Zool., Univ. Michigan, 50:1-38). Reports of buff-colored specimens of O. vernalis were summarized by Collins and McDuffie (1963, J. Ohio Herp. Soc.4:22). They cite nine specimens, two O. v. vernalis from northern Michigan and 7 O. v. blanchardi from the Chicago, Illinois area. This report is the first record of this variation in O. v. blanchardi outside the Chicago area and extends the known range of its occurrence westward by approximately 450 km. We thank J.L. Christiansen for reviewing the manuscript. Submitted by PAUL J. HOLLANDER, R.R. 4, Ames, IOWA 50010 and M.CHRISTOPHER BARNHART, 1000 Pammel Ct., Ames, IOWA 50010.

DISTRIBUTIONAL RECORDS OF SOME REGIONALLY UNCOMMON SNAKES. The following records are presented in view of their relative scarcity in the regions concerned:

CEMOPHORA COCCINEA COPEI (Scarlet snake). U.S.A., Oklahoma, Payne Co., 20 km W Stillwater; 24 April 1969; D.C. Stairs. R.L. Lardie. Oklahoma St. Univ. R 3600. Specimen collected 33 km N of most westerly known locality in Logan Co. (Webb, 1970, Reptiles of Oklahoma, U. Okla. Press).

LAMPROPELTIS TRIANGULUM AMURA (Louisiana milk snake). U.S.A., Texas, Parker Co., 6 km N Aledo; 11 April 1965; R.L. Lardie. R.L. Lardie. Fort Worth Museum of Science and History, previously RLL 523 in collection of R.L. Lardie. County record and supplements Raun and Gehlbach (1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist. Bull. No. 2).

RELICT POPULATIONS OF PITUOPHIS MELANOLEUCUS AND THAMNOPHIS RADIX IN ILLINOIS. The following recent records confirm the statements of Hurter (1903 , St. Louis Acad. Sci. Trans., 13(3):77-86), Smith (1961, Illinois Nat. Hist. Surv. Bull., 28(1):1-298) and Stull (1940, USNM Bull. 175:1-225) that relictual populations of these two species may occur in the Madison - St. Clair Co., Illinois area. Individuals are still common where preferred habitat is available.

PITUOPHIS MELANOLEUCUS SAYI (Bullsnake). St. Clair Co., Rairview Heights; 10 April and 2 May 1970; G. McNaughton. Illinois Nat. Hist. Surv. Collection, INHS 9902-3 and collection of G. McNaughton, GM 003. Caseyville; 14 April 1971; G. McNaughton. Collection of G. McNaughton, alive (3).

THAMNOPHIS RADIX RADIX (Eastern plains garter snake). St. Clair Co., Caseyville; 14 April 1971; G. McNaughton. Collection of G. McNaughton, GM 1914-6. Submitted by GENE McNAUGHTON, 55 Circle Creek Dr., Cahokia, ILL 62206.

CAUDATA

MANCULUS QUADRIDIGITATUS (Dwarf salamander). U.S.A., North Carolina, Vance Co., 10.4 km E Henderson; 12 March 1975 and 26 May 1975; A.L. Braswell. D. L. Stephan and A.L. Braswell. North Carolina State Museum of Natural History NCSM 14805, 3 adults; NCSM 14806, 29 larvae; NCSM 15168, 22 larvae. Extends range 44 km N of previous northernmost locality (N.C., Wake Co., 10.2 km ENE Rolesville, NCSM 12696, 3 larvae), and within 39 km of the Virginia border. Submitted by D. L. STEPHAN, Dept. of Entomology, North Carolina State University, Raleigh, N.C. 27607 and A.L. BRASWELL, North Carolina State Museum of Natural History, Box 27647, Raleigh, N. C. 27611.

PLETHODON ELONGATUS (Del Norte salamander). U.S.A., Oregon, Coos Co., 11.2 km S Powers; 20 April 1975; Oregon State University Herpetology class. OSU Museum of Natural History, OSU 10,712-15 (4 specimens). Extends range 12.0 km N of previous northern limit (Brodie,1970, Herpetologica 26(4)). Submitted by ROBERT M. STORM, JOSEPH J. BEATTY and ROBERT D. PIETRUSZKA, Dept. of Zoology, Oregon State University, Corvallis, OR 97331.

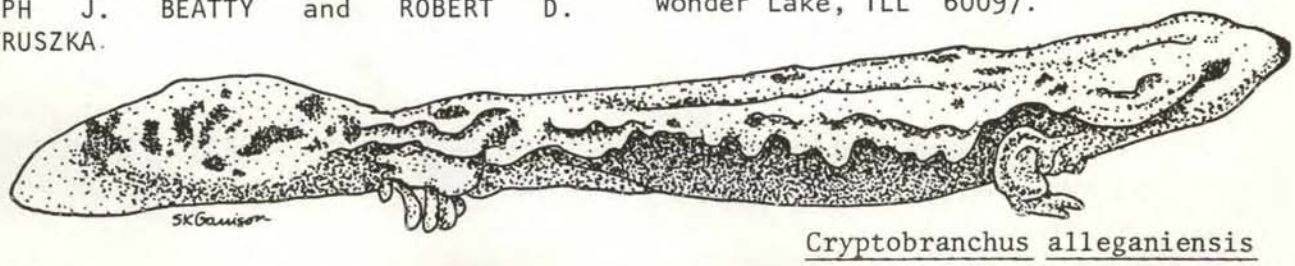
PLETHODON VEHICULUM (Western red-backed salamander). U.S.A., Oregon, Coos Co., 11.3 km SE Powers; 20 April 1975; OSU Herpetology Class. OSU Museum of Natural History, OSU 10, 716-23 (8 specimens). Extends range 6.4 km SE of previous southeastern limit (Brodie, 1970, Herpetologica 26(4)). This report, with the one above, sharply reduces the zone of allopatry between these two Plethodon. The apparent separation of these two species is thus reduced to a 2.4 km section along Road 333 which runs south from Powers to Agnes. Submitted by ROBERT M. STORM, JOSEPH J. BEATTY and ROBERT D. PIETRUSZKA.

SALIENTIA

BUFO ALVARIUS (Colorado river toad). Mexico, Baja California Norte, Mexicali, 9.2 km W (J.F. Allen 255-257) and 9.8 km W (R.S. Funk); 5 June 1963; J.F. Allen, C. H. Croulet and R.S. Funk. Only published Baja California locality is 7.6 km N El Mayor, ca. 72 km south (Brattstrom, 1951, Herpetologica 7(4)). Submitted by RICHARD S. FUNK, Dept. of Biological Sciences, Illinois State University, Normal, IL 61761 and CURTIS H. CROULET, 7791 Gribble St., San Diego CA 92114.

BUFO WOODHOUSEI (Woodhouse's toad). Mexico, Baja California Norte, Mexicali, 9.2 km W and 9.8 km W (J.F. Allen 243-253); 5 June 1963; J.F. Allen, C.H. Croulet and R.S. Funk. Only published Baja California locality is Stebbins (1951, Amphibians of Western North America, p. 502) at lat. 32°15'N near Laguna Salada, S Mexicali (Stebbins, pers. comm.). One of us (RSF) has found this toad to be abundant at Algodones, but no specimens were preserved. Submitted by RICHARD S. FUNK and CURTIS H. CROULET.

GASTROPHRYNE CAROLINENSIS (Eastern narrow-mouthed toad). U.S.A., Illinois, Union Co., near Bluff Lake; 3 June 1969; D. Becker. University of Wisconsin, Stevens Point Collection, UWSP 858. Jackson Co., bank of Mississippi River in Grand Tower; 1 June 1969; D. Becker. P. W. Smith. UWSP 888. Confirms existence in extreme southern Illinois. Specimens were collected between the Mississippi River bluff population and the extreme southeastern Missouri population (Nelson, 1972, J. Herpet. 6:111-137). These, along with the Scott Co., MO record (Dyrkacz, 1973, HISS News-J. 1:152), further decrease this long established hiatus. Submitted by STANLEY DYRKACZ, 3012 Walnut Drive, Wonder Lake, ILL 60097.



Cryptobranchus alleganiensis

NEW COUNTY RECORDS AND RANGE EXTENSIONS OF SOME WEST TEXAS REPTILES. The following records for Texas reptiles supplement those of Raun and Gehlbach (1972, Dallas Mus. Nat. Hist., Bull. No. 2) and Hambrick (1975, Herp. Rev. 6 (3):79-80). Specimens in this report are deposited in the Museum of Arid Land Biology (MALB), University of Texas at El Paso, El Paso, Texas and the Department of Biology, Sul Ross State University (SRSU), Alpine, Texas.

NEW COUNTY RECORDS. Testudines: Kinosternon flavescens, Midland Co. (MALB 2660). Sauria: Crotaphytus collaris, Midland Co. (SRSU 3634); Holbrookia maculata maculata, Midland Co. (MALB 2663-2674); Sceloporus undulatus consobrinus, Midland Co. (MALB 2662); Uta stansburiana, Midland Co. (MALB 2675). Serpentes: Leptotyphlops dulcis, Midland Co. (MALB 2661); Diadophis punctatus arnyi (collected by M. Erskine), Howard Co. (MALB 2852); Masticophis flagellum (collected by W. Tucker), Midland Co. (MALB 2793); Pituophis melanoleucus sayi, Midland Co. (MALB 2853); Sonora episcopa (collected by S. Wilkinson), Midland Co. (MALB 2792).

RANGE EXTENSION. Cnemidophorus sexlineatus, July, 1975; (MALB 2790, SRSU 3636). Establishes another local population approximately 100 km northwest of the nearest one in Reagan Co. Cnemidophorus tigris, Midland Co. approx. 16 km SE Midland; 7 June 1975; (SRSU 3635). Extends range approximately 30-50 km eastward from Ector Co. Submitted by JOHN M. CYS, P.O. Drawer 2437, Midland, TX 79701.

NEW HERPETOFAUNAL RECORDS FOR ILLINOIS. The following records supplement those of P. W. Smith (1961, The amphibians and reptiles of Illinois, Ill. Nat. Hist. Surv. Bull. 28(1):1-298). All specimens are deposited in the Illinois Natural History Survey collection (INHS).

Amphibia: Plethodon cinereus cinereus (Red-backed salamander). Champaign Co., 1.6 km NW Homer; 2-10 December 1972; J. D. Unzicker. INHS 10048. County record and westernmost Illinois locality for the species. Desmognathus fuscus conanti (Spotted dusky salamander). Pulaski Co., 1.2 km NE Olmsted; 16 July 1975; M. A. Morris and L. M. Page. INHS 10204. Reported as extirpated in Illinois by Dyrkacz (1974, Bull. Chicago Herp. Soc. 9(1-2):15-16). Siren intermedia nettingi (Western lesser siren). Bond Co., 0.6 km NE Pocohontas; 7 July 1973; B. M. Burr and R. D. Wrisberg. INHS 10043. County record. Moultrie Co., 1.5 km NW Allenville; 1 July 1965; D.L. Thomas. INHS 9743. Extends known siren range in Kaskaskia River valley ca. 125 km NE Bond Co. record. Rana sylvatica (Wood frog). Edwards Co., 0.6 km S Browns; 10 July 1962; M. E. Braasch. INHS 9614. County record. Gastrophryne carolinensis (Eastern narrow-mouthed toad). Hardin Co., Rosiclare; 13 August 1962; R. D. Gustafson. INHS 9613. First record for southeastern Illinois.

Reptilia: Ophisaurus attenuatus attenuatus (Western slender glass lizard). Cass Co., Virginia Township; May 1970; J. Calhoun. INHS 9827. Lee Co., 3.6 km N Ohio; 12 July 1972; M. D. Jackson. INHS 9842. County records. Lampropeltis triangulum syspila (Red milk snake). Clark Co., Lincoln Trail State Park; 8 October 1972; M. A. Morris. INHS 9959. County record and first hatchling syspila (190 mm total length, 164 mm SVL) reported for Illinois. Natrix erythrogaster flavigaster(Yellow-bellied water snake). Pike Co., W Pleasant Hill; 4 October 1966; R. A. Evers and L. J. Stannard. INHS 10230. Substantiates occurrence of this form in the county. Virginia valeriae elegans (Western smooth earth snake). Coles Co., 2.4 km SSE Rardin; 6 June 1968; P. W. Smith and L. M. Page. INHS 9803. 40 km NW of nearest record;

demonstrates penetration past the Shelbyville Moraine into a predominantly prairie region. Submitted by MICHAEL A. MORRIS, Illinois Natural History Survey, Urbana, IL 61801.

GEOGRAPHIC RECORDS OF SOME SOUTH TEXAS AMPHIBIANS AND REPTILES. This paper adds to the county records and range extensions reported by Raun and Gehlbach (1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist., Bull. No. 2), Lewis (1974, Herp.Rev. 5(1):21), Merkord (1975, Herp. Rev. 6(3):79), and Hambrick (1975, Herp. Rev. 6(3):79-80). All specimens are in the Texas Cooperative Wildlife Collection, Texas A & M University, College Station, Texas. Identification are by the authors.

NEW COUNTY RECORDS. Bufo debilis, Maverick Co. (TCWC 49050); Rana catesbeiana, Medina Co. (TCWC 49034); Cophosaurus texanus, Zavala Co. (TCWC49068); Sceloporus variabilis, Maverick Co. (TCWC 48893); Scincella laterale, Uvalde Co. (TCWC 49167); Crotalus lepidus, Bandera Co. (TCWC 49228); Drymarchon corais, Medina Co. (TCWC 49201); Elaphe guttata, Uvalde Co. (TCWC 49194); Elaphe obsoleta, Uvalde Co. (TCWC 49195); Lampropeltis getulus, Zavala Co. (TCWC 49199); Leptotyphlops dulcis, Uvalde Co. (TCWC 49189); Rhinocheilus lecontei, Medina Co. (TCWC 49209).

RANGE EXTENSION RECORDS. Pseudacris clarki, Uvalde Co., 13 mi N Uvalde; 22 May 1975; C. M. Mather, TCWC 49061). The nearest records are for Atascosa, Bexar and Dimmit Counties. Syrrhophus cystignathoides, Bexar Co., San Antonio; 20 May 1973; C. M. Mather, TCWC 48105-48106. Probably represents an introduced colony, as nearest records are Cameron Co. and Hidalgo Co., Texas. Anolis carolinensis, Uvalde Co., Uvalde; 19 April 1975; C. M. Mather, TCWC 49103. Probably introduced because it was found only in residential areas of the city. The nearest record is Bexar County. Elaphe subocularis, Uvalde Co., 8.3 mi N Uvalde; 3 July 1975; C. M. Mather, TCWC 49196. The nearest records are for Edwards and Val Verde Counties. Thamnophis cyrtopsis, Uvalde Co., 13 mi N Uvalde; 11 June 1975; C. M. Mather, TCWC 49216. The nearest records are for Bandera, Medina and Real Counties. Submitted by CHARLES M. MATHER and JAMES R. DIXON, Dept. Wildlife and Fisheries Sci., Texas A & M University, College Station, TX 77843.

NOTES ON THE OCCURRENCE OF THE LIZARD, TROPIDURUS TORQUATUS (WEID), IN ARGENTINA. Conflicting statements have been reported concerning the range of Tropidurus torquatus (Weid). Burt and Burt (1931) reported on specimens housed in the collection of the American Museum of Natural History from Cruz del Eje, Provincia de Cordoba and from Chaco (presumably Provicia de Chaco)Argentina. Peters and Donoso-Barros (1970) restricted the range of this species to Brazil and the Guianas. Rand and Rand (1966) reported it from these localities, but also included Venezuela in its range. The American Museum specimens reported by Burt and Burt (1931) have been examined by me and are indeed Tropidurus torquatus. In addition seven specimens of this species were collected during the 1974-75 field season from a locality 10 km E Chamicel, Provincia de La Rioja, Argentina. This is approximately 152 km W of the Cruz del Eje locality. Several other specimens conforming to Tropidurus torquatus were observed in Parque de Nacional de Iguazu, Provincia de Misiones along the Argentina-Brazilian border. These records, plus the American Museum specimens confirm the existence of T. torquatus in Argentina.

The Chamicel specimens were collected in the transitional zone between the Dry Chaco and the Monte Desert in a wash dominated by Prosopis chiliensis, Acacia aroma, and Boulnesia sp. The lizards were never found in the open Larrea flats where trees were absent. When approached they would attempt to escape into trees or into burrows in the root systems of the trees. One female

collected in December 1974 contained seven enlarged follicles. The specimens from Parque Nacional de Iguazu were found associated with rocky outcroppings on an island in the Rio Parana. When approached these lizards would escape into cracks in the rocks. Habitat preference and escape patterns from both localities conform to those described by Rand and Rand (1966) for a population of T. torquatus in Belem, Brazil.

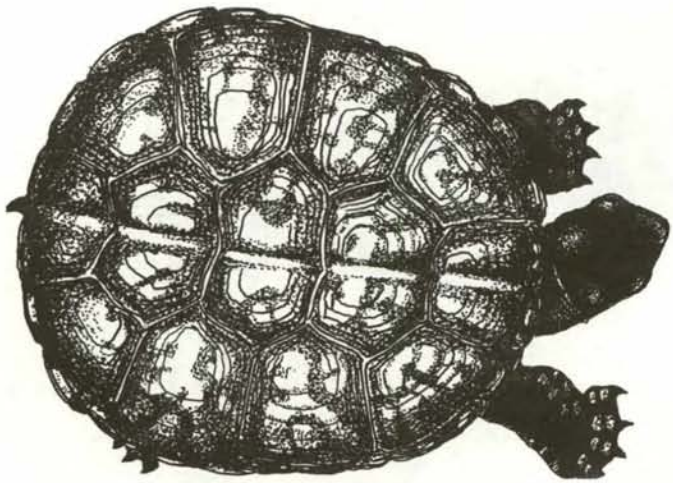
ACKNOWLEDGMENTS

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ARTHUR C. HULSE. Dept. of Zoology, University of Texas, Austin, Texas 78712, USA (present address: Dept. of Biology, Indiana University of Pennsylvania, Indiana, Pennsylvania 15701, USA).



GEOGRAPHIC DISTRIBUTION

TESTUDINES

KINOSTERNON SUBRUBRUM SUBRUBRUM X K.S. HIPPOCREPIS (Eastern x Mississippi mud turtle). U.S.A., Illinois, Alexander Co., Olive Branch, 1 mile E Horseshoe Lake Conservation Area; 8 June 1974; S. Dyrkacz and R. Herrington. S. Dyrkacz. Collection of S. Dyrkacz, SD 91. Third intergrade specimen from Alexander Co. on northern edge of distribution. See Cahn (1937, Ill. Biol. Monog. 16 (1-2): 1-218) and Skorepa and Ozment (1968, Trans. Ill. Acad. Sci. 61 (3) :247-251). Carapace length 85 mm. Submitted by STANLEY DYRKACZ, 3012 Walnut Drive, Wonderlake, Illinois 60097.

SALENTIA

RANA CATESBEIANA (Bullfrog). Mexico, Baja California Norte, Mexicali, 9.8 km W (J.F. Allen 254); 5 June 1963; J. F. Allen, C. H. Croulet and R. S. Funk. Algodones (R. S. Funk 3540); 13 Aug. 1970; R. S. Funk. First records from Baja California Norte east of Sierra de Juarez; known from west of this range and from adjacent Imperial Co., CA and Yuma Co., AZ, U.S.A. (Stebbins, Field Guide to Western Amphibians and Reptiles map 53). Stebbins (pers. comm.) has indicated he knew of no specific records from NE Baja CA. Over a several year period (1962-1970), one of us (RSF) has heard calls of this frog in Baja CA along the Colorado River between Algodones and a locality ca. 8 air km NW Riito, Sonora, and also at Campo Rio Hardy on the Rio Hardy (ca. 19 km S La Puerta on Mex. Hwy. 5), but no specimens were collected. Submitted by RICHARD S. FUNK and CURTIS H. CROULET.

Drawing by Roberta Plummer, MPM

NOTICE: The Current Literature project is now being handled by the Milwaukee Public Museum. All searchers: please note the change in address.

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Any questions, comments, etc. should be sent to:

Max A. Nickerson
Current Literature
Vertebrate Division
Milwaukee Public Museum
Milwaukee, Wisconsin 53233

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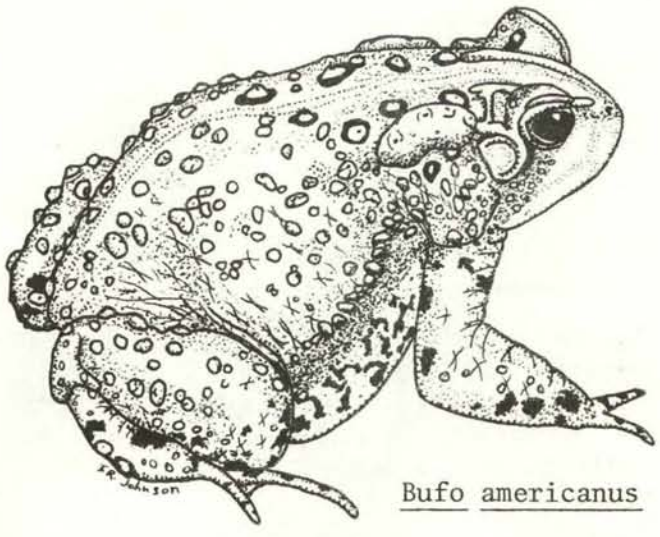
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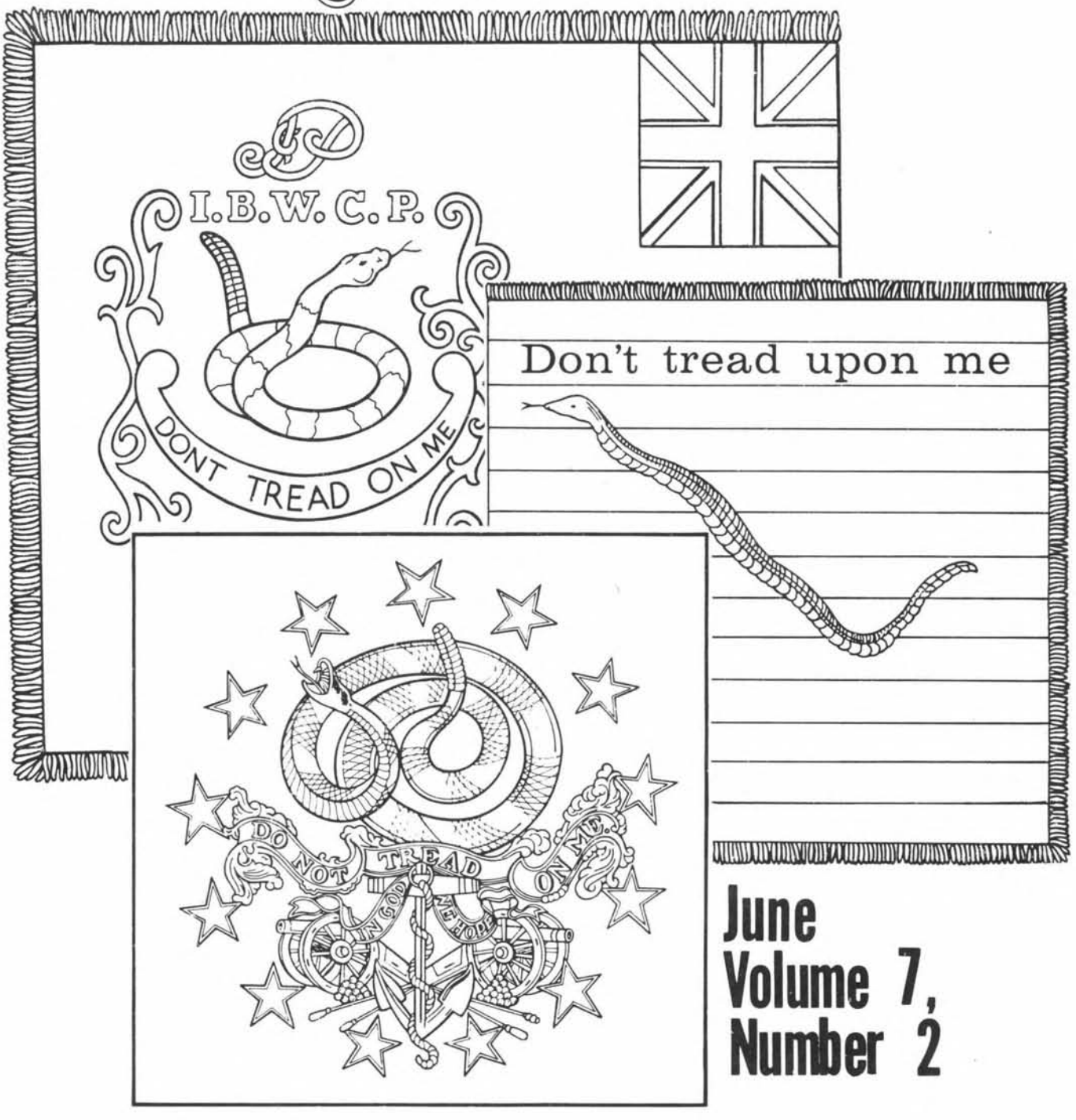
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June
Volume 7,
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****

Volume 7

Number 2

June, 1976

TABLE OF CONTENTS

Loch Ness Monster Evidence Presented at Cornell University by Kraig Adler 41

Programs and Abstracts of the 19th Annual Meeting of the SSAR: A Joint Meeting with the Herpetologists' League, Miami Univ., Oxford, Ohio 47-103

****

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NOTICE

OPENING FOR EDITORSHIP HERPETOLOGICAL REVIEW

At the end of this calendar year, Dr. Max Nickerson will be terminating his Editorship of HERPETOLOGICAL REVIEW. The SSAR is currently seeking a replacement to assume this important function.

HERPETOLOGICAL REVIEW is the quarterly News-letter publication of the society. The editor is responsible for all phases of operations relating to publication and distribution. Specifically, this includes selection of section editors, soliciting advertising, scheduling printing, billings, setting up for printing and distribution, as well as other relevant tasks.

Persons who may be interested in being considered for the Editorship are requested to submit their names to Dr. Nickerson, Vertebrate Division, Milwaukee Public Museum, Milwaukee, Wisconsin 53233, accompanied by a statement as to the resources available to assist them in publication activities. The deadline for consideration of candidates will be 25 July, 1976. Appointment of the new Editor will be made by the SSAR officers during the 1976 annual meetings in August.

EDITOR'S NOTE

The enormous response to the SSAR/HL meetings at Miami University of Ohio this August has forced us to print a double sized issue of Herpetological Review. Additionally, all normally scheduled sections and papers have been reassigned to HR 7(3). The role of Herpetological Review is clearly stated in the SSAR Constitution and SSAR business and functions are published on a priority basis. We are most pleased with the enthusiastic response to the forthcoming meetings but are chagrined by the inconvenience which some authors will suffer.

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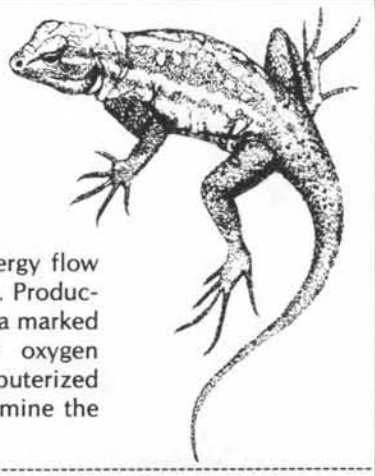
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LOCH NESS MONSTER EVIDENCE PRESENTED AT CORNELL UNIVERSITY

On May 4th, an audience of 1500 Cornell faculty and students examined the most recent photographic and sonar evidence for the existence of large unidentified animals in Scotland's Loch Ness. It was the first time that these data had been presented publicly and then opened to critical evaluation by a group of scientists. Although the event was covered by Associated Press and received international syndication, it was felt that a more detailed published account with some of the original data would be of value, and especially because of its potential special interest to the herpetological community.

The purpose of the program was to provide a forum for a long-overdue public examination of the evidence by scientific experts, but it was also intended as an educational device to demonstrate for students the ways in which science approaches new discoveries which, by their very nature, are often on the edge of believability. The lecture was presented by Charles W. Wyckoff, president of Applied Photo Sciences, Inc., of Needham Heights, Massachusetts. Mr. Wyckoff, a widely-respected inventor of wide-exposure-range films, is the photographic consultant to the Loch Ness Project sponsored by the Academy of Applied Science of Boston. Mr. Wyckoff's lecture was followed with a panel discussion by distinguished Cornell faculty, among them several members of the U. S. National Academy of Sciences and including experts in remote sending, imagery, vertebrate anatomy, paleontology, and biology. I organized the event and served as moderator.

Mr. Wyckoff's Lecture

Mr. Wyckoff began by giving a description of Loch Ness, the largest body of fresh water in the British Isles. It is about 24 miles long, 1.5-2 miles wide, and has a nominal depth of 700 feet, although depths of 975 feet have been recorded;the sides of the Loch are quite steep (Fig. 1). The waters are cold year-round, varying by only a few degrees from about 42°F. The water has a yellow-brown color due to large quantities of suspended peat particles which reduce underwater visibility to a few feet. Wyckoff's group has worked primarily in Urquhart Bay along the west shore of the loch since this area accounted for the largest number of sightings of the monster over the last several decades. Furthermore, the beasts are thought to feed on salmon that regularly congregate in Urquhart Bay before migrating upstream to spawn.

The first recorded sightings of a "monster" in Loch Ness was by St.Columba in 565 A.D. After the construction of a modern road along the west side of the lake in the 1930's the number of reported sightings increased dramatically but, as Mr. Wyckoff pointed out, there were a number of hoaxes and several photographs were obvious fakes. Perhaps the most famous of the supposedly authentic photographs is the "surgeon's photograph" (Fig. 2) taken in 1934 but, typical of surface photographs, it is a silhouette and shows no detail;furthermore, Mr. Wyckoff noted that there is no sense of scale.

The present series of photographs and sonar data was obtained by members of the Loch Ness Project sponsored by the Academy of Applied Science, a private organization of several hundred scientists, inventors and industrialists devoted to the support of unusual areas of research. The Project is led by Dr. Robert H. Rines,a Boston patent attorney and Dean of the Franklin Pierce Law Center in New Hampshire. In 1972 they obtained the famous "flipper" photographs, together with a simultaneous sonar record (Fig. 3). But as Wyckoff noted, these photographs suffer from the back-scatter of light

from suspended peat particles and the photos, therefore, required computer enhancement, a process that sharpens an image but does not falsify the record.

In order to minimize the light-scattering problem during the 1975 season, Wyckoff separated the light source from the camera (Fig. 4) and further improved the system by using a sonar-gated signal that turned on the cameras only when a target of sufficient size came within camera view. These techniques were successful in producing the dramatic color photographs in Plate I, which, according to Wyckoff and his colleagues, show various portions of the head, neck and body of one of the creatures.

After last summer's work the Rines-Wyckoff group made plans to present their data to zoologists at a meeting organized by the Royal Society to be held in Edinburgh last December. But at the last minute the meeting was cancelled by the organizers due to premature adverse publicity that was precipitated by the publication of a revised edition of Witchell's "The Loch Ness Story" which contained a detailed description of the 1975 data but no photographs. At the same time, the Rines group was further criticized for publishing a formal scientific name for the Loch Ness Monster (Nessiteras rhombopteryx Scott and Rines, 1975). But, as Wyckoff noted, the sole purpose of this article was to facilitate full protection for the beast in the event that its existence was proved since, under British law, protection can be granted only to organisms having a scientific name. Nevertheless, a confidential presentation of the data was made by the group to a joint committee of both Houses of Parliament and protection now seems assured.

Wyckoff concluded his lecture by saying that this summer's expedition will use the same equipment as before, but also underwater television directed at the cameras so that any disturbance of the apparatus by the beast can be witnessed. Furthermore, they will be using high-resolution sonar in order to locate any skeletal remains on the silty bottom of the loch before recovering them. He noted that although they have succeeded in overcoming much of the stigma of ridicule, they have had to support the entire operation from their own private funds.

The Panel Discussion

After Mr. Wyckoff's lecture, six Cornell faculty were invited to the stage to make comments on the data and to question the speaker. Each had been given copies of the data in advance; only the more substantive points are recorded here.

Dr. Melvin L. Kreithen, a specialist in vertebrate sensory physiology, pointed out that the greatest strength of the approach used by Wyckoff and his colleagues is that three different modalities are involved simultaneously: photographic, sonar and the mechanical disturbance of the cameras (Plate I). Kreithen asked if the sonar records could be caused by sound echoing off of thermoclines, but Wyckoff noted that at the observation site the thermoclines were at depths of several hundred feet, well beyond the range of the cameras.

Dr. Thomas Eisner, a behavioral ecologist, asked why hydrophones had not been used to detect possible sounds made by the beasts. He pointed out that sounds undoubtedly are made when the camera is disturbed or simply when any object moves past the cameras. Furthermore, in the murky waters of the Loch, it seems reasonable to expect any large, widely-spaced-out animals to use echolocation to find prey and mates. Wyckoff answered that hydrophones had indeed been used, that there were no positive results and they were discontinued after the 1971 season. Nevertheless, he now feels that the sound frequency spectrum was too narrow

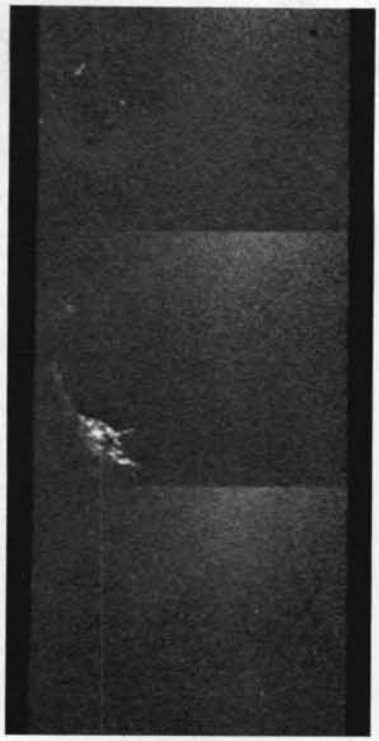
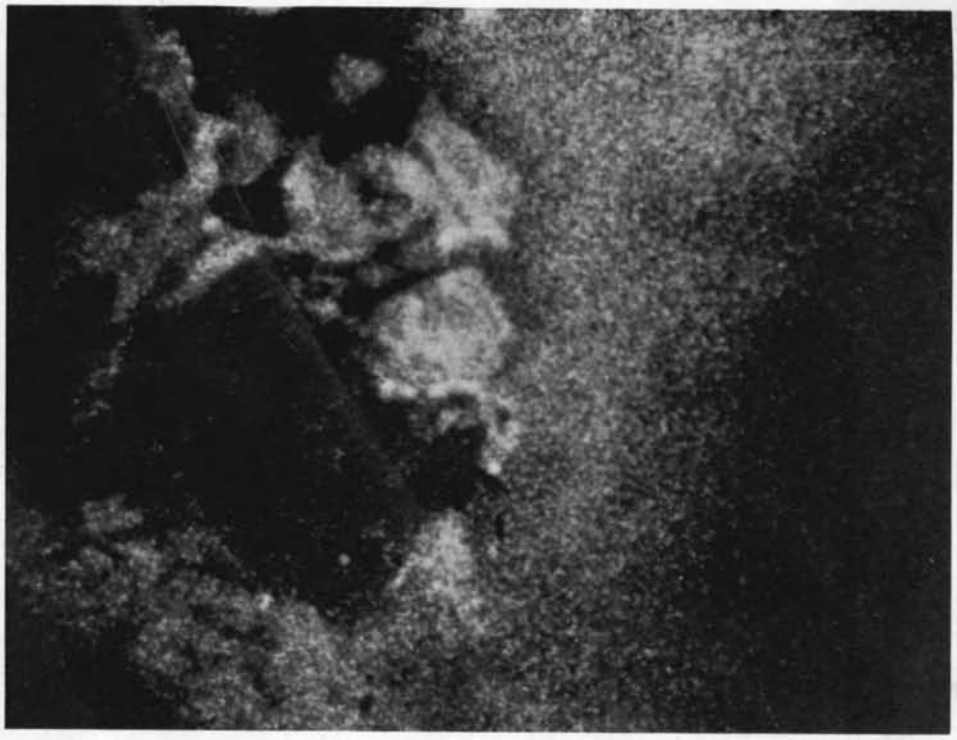


PLATE I (A) Photograph taken at 4:32 AM, 20 June 1975, purportedly of the upper body, neck and head; note absence from adjacent frames taken at 1.2 min intervals from center shot. Light cone and densitometric measurements indicate that "body" was at distance of 25 ft and "neck" was about 10 ft long.









(B) Photograph taken at 11:45 AM, 20 June 1975, showing "head". This series of six frames (intervals, 1.2 min) records a period of major disturbance, with the camera swinging upward; note bottom of boat, length 20 ft. The center shot, enlarged at right, is interpreted by Wyckoff's group as the head, showing bilateral symmetry in half-profile; note the mouth and nostrils at right and the several horn-like protrusions. An interpretive drawing by Sir Peter Scott is shown at bottom. The "head" was about 5 ft from the camera and is estimated to be 2 ft long. Camera-strobe arrangement for all photos in plate I is shown in fig. 4. (All photographs copyright Academy of Applied Science)

and that these experiments should be repeated.

Dr. Donald J. Belcher, an authority on remote sensing data, made an interesting point concerning the "surgeon's photo" (Fig. 2). He noted that the beast appears to have set up a series of refractory waves that interrupt the entire wave pattern surrounding it. This would imply that the object had a considerable mass and tends to rule out the common criticism that it is merely a bird or some other small object.

Dr. Howard E. Evans, an anatomist and authority on aquatic vertebrates, stated that he had no doubt that the photos were of living creatures but he interpreted them to be a giant sturgeon, noting the existence of the white sturgeon of Russia which reaches a length of 24 feet. Evans suggested that Plate IA might be the tail-end of a sturgeon, and the "head" in IB the mouth-parts of an upside-down sturgeon in which the so-called "tentacles" are simply barbels. The failure to recover any skeletal remains could be accounted for by the fact that these fish are cartilaginous and perhaps only the dermal plates would become fossilized. Finally, he suggested that the concentration of monster sightings in Urquhart Bay might be due to its use as a sturgeon spawning site rather than a place to capture migrating salmon. Wyckoff remarked that sturgeon have never been reported anywhere in the British Isles, but that they had already considered this possible interpretation of their photographs and rejected it.

Dr. Carl E. Sagan is an astronomer and is noted for his work on the Mariner probes of Venus and Mars, projects involving some of the same photographic enhancement techniques used in the Loch Ness Project. Sagan stated that the possibility of a hoax in this instance is quite remote because of the reputations of the persons involved and because of the elaborateness necessary to perpetrate a hoax when the data-gathering techniques are so sophisticated and involve so many simultaneous modalities. He also remarked that he had contacted his associates at the Jet Propulsion Laboratory in Pasadena, California, where the Loch Ness photos had been processed and they are convinced of the photographs' authenticity. Sagan felt that the Rines-Wyckoff data, although not definitive, were the best hard evidence now available and cause him to believe that large unidentified organisms do exist in Loch Ness.

Sagan then mentioned his recent calculation of the possible number of monsters in Loch Ness, based on the mean-free-time method of collision physics. A rough measure of the number can be calculated based on the collision distance (the camera's range), the organism's velocity and the average time between encounters. His estimate of a number of beasts is "between several tens and several hundreds"(Sagan, 1976), with an average separation distance between animals of about 0.4 km. He said that the number density estimate is, interestingly, about the same as that derived by completely independent means based on biomass calculations that assume a diet of fish (Sheldon and Kerr, 1972). Wyckoff added that if we assume that each of the half dozen locations where sightings are most numerous represent a "family group", then the total number of individuals in Loch Ness may similarly be in the same range of values.

Dr. John W. Wells, a geologist and paleontologist, stated that during the Pleistocene Loch Ness was filled to the bottom with ice since it has the typical transverse profile of a glaciated valley. Since the ice receded about 12,000 years ago, any monsters must have come in from the sea after that time. Wells said it was highly unlikely that any Mesozoic marine reptiles such as Plesiosaurs could have done so since there are no fossil records beyond the Mesozoic, and that all species were tropical in distribution He suggested that the

beasts may be fish and noted the discovery of the carcass of a basking shark on the shore of Loch Ness in 1942.

Concerning the new photographs, Wells thought that some of them looked like old logs whose rapid movement in and out of camera view (Plate I) could be accounted for by the passage of internal waves which cause no surface movement, yet involve a very considerable transfer of energy. Wyckoff noted that in one of the photographs a cylindrical object with a diameter of 6-8 ft was observed, yet there are no trees in the vicinity of Loch Ness today having diameters in excess of 4 ft. Wells countered with the suggestion that the submerged trunks could have been remnants of the very large trees of the great Caledonian Forest of Scotland, which burned down within historic times.

Personal comments: Although there was disagreement amongst the panel the data are actually derived from more than one sort of thing, all agreed that there are large unidentified objects in Loch Ness that require a rational explanation. Certainly this is an important step forward for this work, since many critics have regarded the "monsters" as a complete myth having no substance whatever. The weight of the data collected by the Rines-Wyckoff group has slowly had an impact on those willing to consider it in detail and the presentations before Parliament and at Cornell together with positive comments by several prominent scientists elsewhere, have given credibility to this team's efforts. This increased confidence was recently demonstrated by the announcement that The New York Times has decided to financially support this summer's effort. The Academy team left for Loch Ness on May 30 for a full summer's work. This is being covered by an NBC film crew and Times reporters and photographers have been sending back regular dispatches. The methods being used this summer are more extensive and sophisticated than ever before used at Loch Ness. This, coupled now with the cooperation of several zoologists and paleontologists at the Loch, gives hope that we may indeed be on the verge of resolving the mystery first recorded by St. Columba fourteen centuries ago.

Those readers who wish to consider in greater detail the more extensive photographic and sonar evidence collected to date by the Academy team should write for a copy of the article by Rines et al. (1976), available for $1.00 per copy from "Ness", Technology Review, Room E19-430, Massachusetts Institute of Technology, Cambridge, Mass. 02139.

I acknowledge my gratitude to Mr. Wyckoff and Mr. Dennis L. Meredith for the photos used here.

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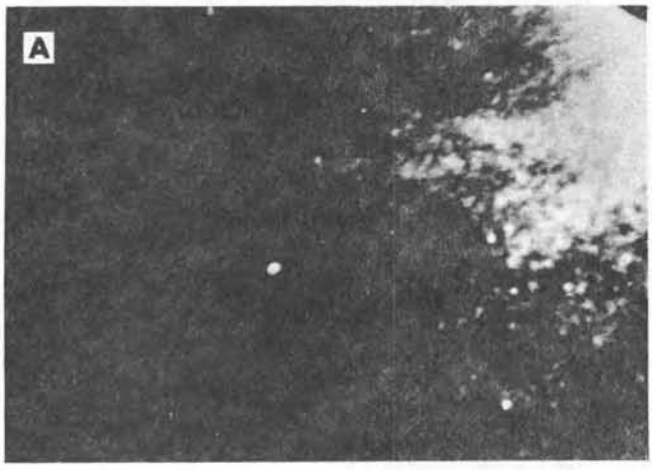
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FIGURE 1 Three-dimensional map of Urquhart Bay, located midway along the west shore of Loch Ness. The ruins of Urquhart Castle stand on the promontory at the extreme left and the Enrick and Coiltie rivers enter Loch Ness here. Most of the work of Wyckoff's group has been done in the shallow waters along the gently-sloping shelf shown at the upper right in this drawing. The vertical dimension is expanded about 3 times to emphasize the bottom contours; horizontal lines mark 100 ft intervals of depth, the deepest one shown here at 500 ft. (copyright Academy of Applied Science)



FIGURE 2 The famous "surgeon's photograph" taken by Dr. Robert K. Wilson, a London gynecologist. The photo was taken in April 1934 about 2 mi north of Invermoriston, along the west shore of Loch Ness below Urquhart Bay. This is the first of a pair of photos, the second showing the object leaning "forward" when it submerged. Until the recent photos, this one attracted the most publicity since there has been no evidence of tampering with the negatives but it is merely a silhouette and shows no surface detail. It has been interpreted as the head and neck of a monster, although some claim it is merely a bird's neck or an otter's tail. (copyright Associated Newspapers)





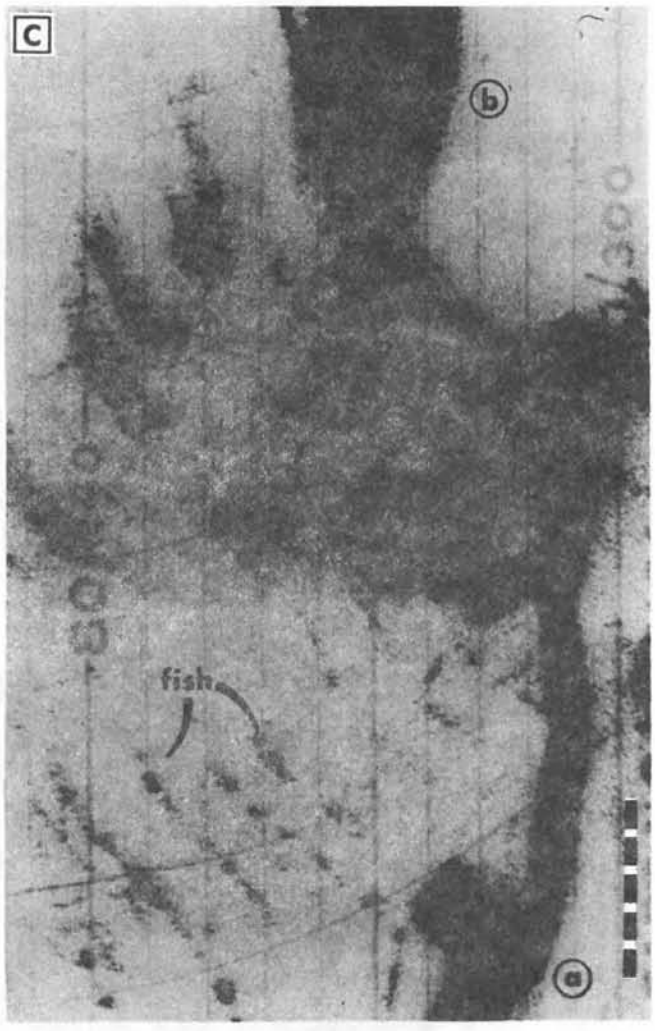


FIGURE 3 First underwater photographs and associated sonar record of the Loch Ness monster, taken on 9 August 1972. (A) and (B) are the so-called "flipper" photos, shown here computer-enhanced and duplicated with higher-than-normal photographic contrast. (B) was taken 45 sec after (A) and measurements from these indicate a "flipper" length of 4-6 ft; they are estimated to be about 4 ft from the camera. The tiny black triangles in one corner of each photo are caused by the strobe apparatus and should be disregarded. Simultaneously, the sonar record (C) was obtained using a Raytheon model DE 725C echo sounder with a frequency of 200 kHz. The record reads in 6-ft intervals (indicated by the faint vertical lines) from the sonar apparatus that was located to the left; the vertical axis reads in time, from 1:45 to 2:00 AM, bottom to top respectively. The period during which photos (A) and (B) were taken is indicated by the dashed line at the lower right in (C). According to Wyckoff, sonar experts have interpreted this record as showing a moving school of fish (the series of faint, parallel lines moving diagonally across the record) and two large objects (a, b) separated by a distance of about 12 ft; one of them (a) has large protuberances or "appendages" on one side. Both the sonar transducer and camera-strobe apparatus were located at depths of 35 and 45 ft, respectively, about 120 ft from shore (see Fig. 1). (copyright Academy of Applied Science)

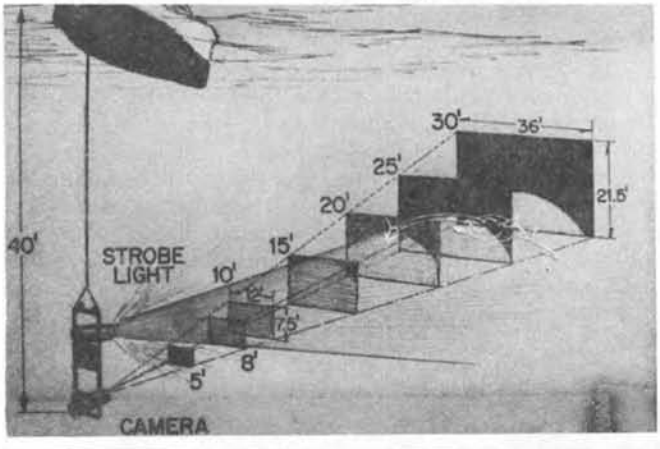


FIGURE 4 Camera-strobe arrangement for photographs shown in plate I, showing apparatus suspended from a boat. The camera field of view intersected the strobe beam at an angle in a way that only objects at a distance of 10 ft were fully illuminated. This geometric arrangement, together with light density measurements, was used by Wyckoff to determine the distance and size of an object. Included here is a schematic of the object shown in plate IA. At this distance the "body" would be fully illuminated but the "head," since it extends toward the camera, would cast a shadow over part of the "neck" making the object in plate IA appear to be two separate structures. (copyright Academy of Applied Science)

PROGRAM and ABSTRACTS

of the

19th Annual Meeting of

THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

A Joint Meeting with

THE HERPETOLOGISTS LEAGUE

8 - 12 August 1976

Miami University, Oxford, Ohio

SCHEDULE OF EVENTS

All times are EDST

The Contributed Papers Sessions and the Symposium will be held in the Miami University Student Center in the Towers Room and the Heritage Room (second floor of the Center).

8 Aug., Sunday	- 1200-1730	- Registration, Lobby, Miami Univ Student Center
	- 1400	- Herp. League Bd. Meeting, Room 239
	- 1600	- SSAR Board Meeting, Room 237
	- 2000	- Joint SSAR-HL Meeting, Room 237
	- 2000	- Informal Slide Show, Towers Room
9 Aug., Monday	- 0800-1200	- Registration, Lobby, Univ. Center
	- 1300-1700	- Registration, Lobby, Univ. Center
	- 0800	- Call to Order, Heritage Room
	- 0830-1200	- Symposium on Reproductive Biology of Amphibians begins. Opening remarks by Dr. Uzzell in Heritage Room.
	- 0800	- Committee on Resources in Herpetology Meeting, Room 239
	- 1300-1715	- Symposium
	- 2000	- Social - Hueston Woods Lodge
10 Aug.,Tuesday	- 0800-1145	- Symposium
	- 1300-1700	- Symposium
	- 1700	- SSAR Business Meeting (Heritage Room)
	- 2000	- Chicken Dinner (Pfeffer Park)

11 Aug., Wednesday - 0830-1200 - Contributed Papers (Heritage and Towers Rooms).
- 1330-1715 - Contributed Papers (Heritage and Towers Rooms).
Informal Wednesday evening activities are being planned and will be announced Wednesday afternoon.

12 Aug., Thursday - 0830-1200 Contributed Papers (Heritage and Towers Rooms).

Times of the contributed papers will be mailed to each participant and pre-registrant. Others will receive them in their registration packet, or by mail, if requested.

We have scheduled 86 contributed papers to be presented Wednesday and Thursday morning. The large number of papers necessitated that we schedule concurrent sessions.

Directions to Miami University - see attached map.

Housing: An air-conditioned conference dormitory (Morris Hall) is located one block away from the University Center. Conference dormitory rates are: $6.00 per day per person for a double room and $8.50 per person per day for a single room (towels and sheets provided). The check-in counter is located in the lobby of Morris Hall and a desk clerk will be on duty 24 hrs/day.

Room fees should be paid upon check-in. In order to facilitate check-in at the Conference Center, we would appreciate your filling out the housing form attached to the pre-registration packet and returning it when you pre-register. These facilities are convenient and are run in a manner similar to that of a motel. A limited number of family suites are also available. If you prefer to stay in a motel the following moderately priced motels are within three miles of campus:

College View Motel
South U.S. 27
Oxford, OH 45056
Tel: 513-523-6311

Miami Motel
West 27
5235 College Corner Pike
Oxford, OH 45056
Tel: 513-523-6306

Oxford Motel
West 27
Oxford, OH 45056
Tel: 513-523-4166

Camping Facilities: Both Tent and Recreational Vehicle Camping Sites (350) are located five miles away at Hueston Woods State Park (reservations may be made by writing, or calling, Hueston Woods State Park, Rt. 1, College Corner, OH, 45003, (513) 523-6347; Reservations may be made up to 30 days in advance.

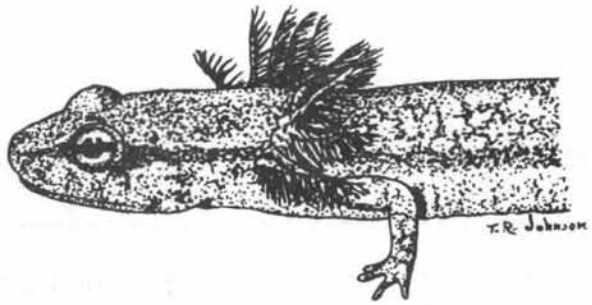
Food: The University Union has a cafeteria, an excellent restaurant and two snack bars for meals and snacks. Additionally, restaurants in uptown Oxford are only a 10 minute walk. Recreational rooms and services will also be open during the meeting, i.e., bowling, pool tables, T.V. rooms, etc.

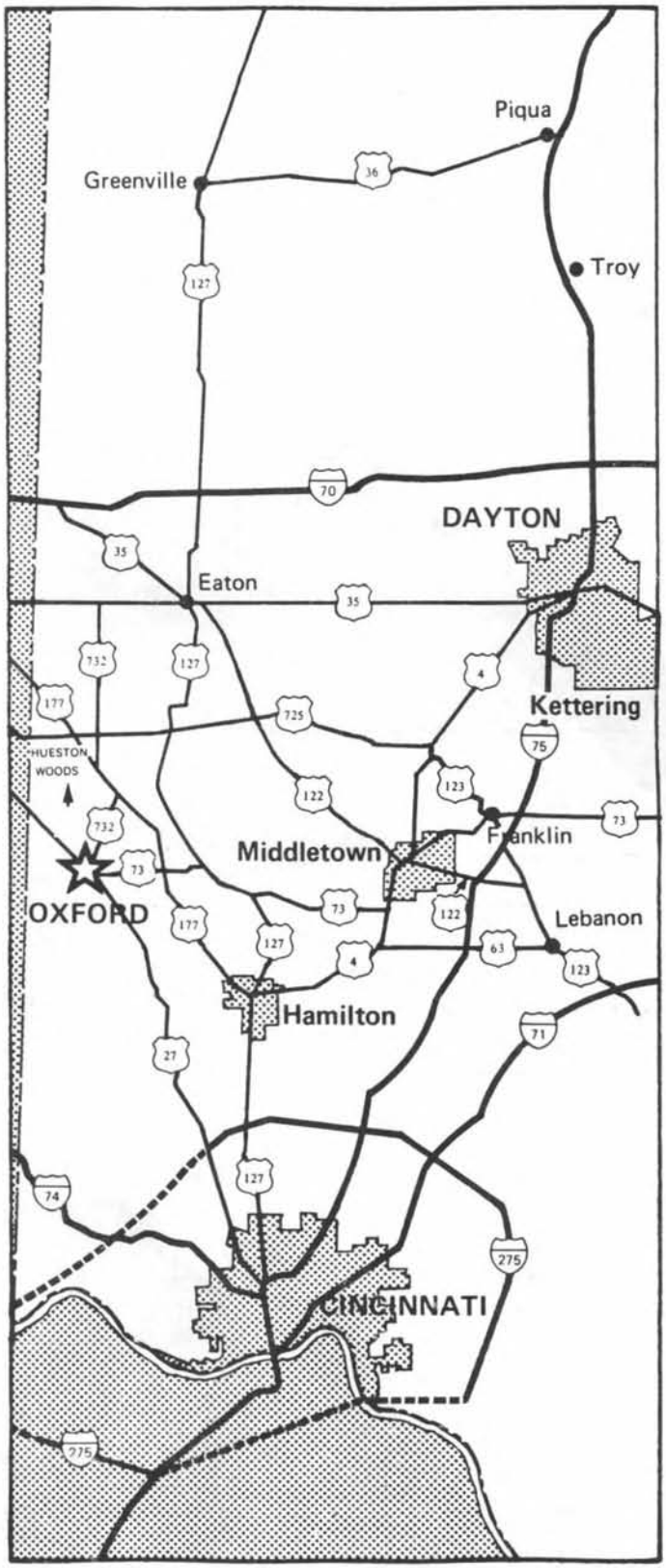
Herp Art Showing: A number of people have indicated an interest in displaying paintings, and other artwork, of amphibians and reptiles at the meeting. A room has been reserved for this purpose at the University Center. Anyone who wishes to exhibit paintings, photographs, sculpture, etc., please contact Douglas H. Taylor, Dept. of Zoology, Miami Univ., Oxford, OH 45056 (Tel: 513-529-4901) by 2 August 1976 relative to what, what size and how many items you wish to exhibit. Any information related to needs in order to arrange your exhibit should also be included.

Extra-Meeting Activities: Trips to Cincinnati Zoo, Cincinnati Art Museum, Hueston Woods Nature Center and other points of interest are planned. Hueston Woods Beach and Swimming Area is close by and open for our use.

Exhibits:

Live Animals: A display of Ohio herps will be set up in the University Center. Ohio herpetologists are encouraged to assist in developing this exhibit. Anyone who can lend Ohio herps for this purpose please contact Sheldon Guttman, Dept. of Zoology, Miami Univ., Oxford, OH 45056 (Tel: 513-529-4595).





GRAY-BELLIED SALAMANDER
1 3/4-3¼ inches
(neotenic)

Pre-Registration Forms

The registration fee includes the cost of meeting rooms, social, coffee breaks, printing and mailing, chicken Bar-B-Que, etc. Pre-registration is $10.00. Registration after August 2 and at the meeting will be $12.00. ONLY send in pre-registration and group photo payments now. Pay for housing upon check-in.

NAME _____

ADDRESS _____

_____ ZIP CODE _____

ARRIVING _____ (DAY, DATE) LEAVING _____ (DAY, DATE)

HOUSING REQUIREMENTS
(Pay for housing upon check-in)

_____ Nights double occupancy at $6.00/night/person

_____ Nights single occupancy at $8.50/night/person

FAMILY ACCOMODATIONS: A limited number of family suites are available.

_____ Number of beds needed at $6.00/night/person

PRE-REGISTRATION

_____ Pre-registration fee(s) at $10.00 per person $____

_____ Group photos (B&W, 8 x 10) at $1.00 (postage included) $____

MAKE CHECKS PAYABLE TO: SSAR-HL: MIAMI UNIVERSITY
MAIL THIS FORM BY 26 JULY, 1976 TO:
DOUGLAS H. TAYLOR, DEPARTMENT OF ZOOLOGY, MIAMI UNIVERSITY, OXFORD, OHIO 45056

AIRPORT PICK-UP FORM
(Cincinnati, OH Airport ONLY)

I will be arriving at Cincinnati on _____ (Airline) Flight Number _____

on _____ (Day, Date) at _____ (Time); use time as indicated by airline. Cincinnati is EDT. Look for someone holding a sign saying "SSAR-HL" in front of the TWA ticket counters.

*****ALL FORMS MAY BE MAILED TOGETHER OR SEPARATELY. SEND TO: DOUGLAS H. TAYLOR, DEPARTMENT OF ZOOLOGY, MIAMI UNIVERSITY, OXFORD, OHIO 45056

MONDAY, Aug. 9
Heritage Room

Symposium: Reproductive Biology of Amphibians
(All Sessions, Thomas Uzzell, Philadelphia Academy of Natural Sciences, Presiding)

0800 Call to Order, James Vial, (University of Missouri, Kansas City) Chairman, SSAR.

Announcements: Meeting Co-Chairmen.

0830 Introduction of the Symposium, Thomas Uzzell, (Philadelphia Academy of Natural Sciences)

0845 Reproductive Ecology of North American Plethodontids. Stephen G. Tilley (Smith College, Northhampton, Massachusetts)

0935 Reproductive biology of Paedogenic Salamanders. Max A. Nickerson (Milwaukee Public Museum, Milwaukee, Wisconsin)

1025 -- COFFEE BREAK --

1045 Reproductive biology of neotropical salamanders. Lynne Houck (Museum of Vertebrate Zoology, University of California, Berkeley, California)

1135 --LUNCH--

1330 The reproductive biology of caecilians. Marvalee H. Wake (University of California, Berkeley, California)

1420 Aspects of the reproductive biology of Japanese amphibians. Toshijiro Kawamura (Laboratory for Amphibian Biology, Hiroshima, Japan)

1510 --COFFEE BREAK--

1530 The courtship behavior of new world salamanders. Steven J. Arnold (University of Chicago)

1620 The comparative reproductive ethology of European newts: An evolutionary perspective. T. R. Halliday (Animal Behavior Research Group, Oxford, England)

TUESDAY, Aug. 10
Heritage Room

0830 The evolution of courtship behavior in Anurans. K. D. Wells (Smithsonian Tropical Research Institute)

0920 Divergence, convergence and stability in Anuran acoustic signaling systems concerned with reproduction. Murray Littlejohn (University of Melbourne, Australia)

1010 --COFFEE BREAK--

1030 Auditory behavior and physiology of vocalization in the European tree frog, Hyla arborea (L.). Hans Schneider (Zoologisches Institut Universitat, Bonn, Germany)

1120 Auditory processing of vocal signals in anurans. Robert Capranica (Cornell University)

1210 --LUNCH--

1330 Systematics and hybridization in the Rana esculenta complex. Leszek Berger (Polish Academy of Science, Poland)

1420 Reproduction and mating behavior in Rana lessonae - Rana esculenta mixed populations. Hansjorg Blankenhorn (Zoologisches Institute des Universitat, Zurich, Switzerland)

1510 --COFFEE BREAK--

1530 Cytotaxonomic and cytogenetic investigations in European newt species. Giorgia Mancino (Instituto di Zoologia dell 'Universita Pisa, Italy)

1620 Concluding Remarks: Thomas Uzzell, (Philadelphia Academy of Natural Sciences)

WEDNESDAY, Aug. 11
Heritage Room

Contributed Paper Session
(Morning Session, George Murphy, Middle Tennessee State University, Presiding)

0830 Orientation by means of polarized light in bullfrog tadpoles, Rana catesbeiana. Jill Shore Auburn and Douglas H. Taylor (Miami University)

0845 Chameleons of Madagascar (a motion picture film by the late Dr. Stephen R. Parcher). (University of Oklahoma)

0900 Life history phenomena in the American toad, Bufo americanus. Debra C. Casebere and Douglas H. Taylor (Miami University)

0915 A comparative study of orientating mechanisms utilized by three species of turtles (Chrysemys picta, Trionyx spiniferus, Terrapene c. carolina). Christopher T. DeRosa and Douglas H. Taylor (Miami University)

0930 Species discrimination in mate selection by free-living male garter snakes and experimental evidence for the role of pheromones. Michael C. Devine (University of Michigan)

0945 Antipredator mechanisms of neotropical salamanders. C. Kenneth Dodd Jr. (National Museum of Natural History) and Edmund D. Brodie Jr. (Adelphi University)

1000 -- COFFEE BREAK --

1015 Homing to the nest by female Desmognathus ochrophaeus, with comments on the sensory modalities essential in clutch recognition. Don C. Forester (Towson State University)

1030 Feeding behavior in the snakes Regina alleni and Regina rigida. Richard Franz (Florida State Museum, University of Florida)

1045 Reproductive behavior of the Rat snakes of eastern North America, genus Elaphe. James C. Gillingham (University of Oklahoma)

1100 Coral snake mimicry: does it occur? Harry W. Greene (University of Tennessee)

1115 Individual differences in the vocalizations of the Bullfrog, Rana catesbeiana. James D. Haas (Tufts University)

1130 Path characteristics in a population of Eastern Box turtles. Stephen P. Hall (University of North Carolina)

1145 Mating strategies in Rana catesbeiana. Richard D. Howard (University of Michigan)

1200 Rib penetration as an antipredator mechanism in Pleurodeles waltl. Robert T. Nowak and E.D.Brodie Jr (Adelphi University)

1215 -- LUNCH --

WEDNESDAY, Aug. 11
Towers Room

Contributed Paper Session
(Morning Session, Joseph Tihen, University of Notre Dame, Presiding)

0830 Analysis of aerial locomotion in Ptychozoon lionatum, with a reconsideration of gliding and parachuting in vertebrates. Brian D. Clark (University of Michigan)

0845 Natural selection and anuran locomotion. Martha L. Crump and Stanley N. Salthe (Brooklyn College of City University of New York)

0900 Concentrations of lactic acid in neotenic and transformed Tiger salamanders (Ambystoma tigrinum) before and after activity. Janette R. Cushman and Gary C. Packard (Colorado State University)

0915 Durophagic adaptations of Dracaena guianensis. G.H. Dalrymple (Ohio State University)

0930 Effects of simultaneous and sequential treatments with estradiol and progesterone on the oviduct in ovariectomized Anolis carolinensis. James D. Fawcett (University of Nebraska)

0945 The role of the trunk in the locomotion of some scincid lizards. Robert M. Fisk (University of Chicago)

1000 --COFFEE BREAK --

1015 Histological changes in the thyroid of ovariectomized Anolis carolinensis following estradiol and testosterone treatments. Juliann D.-U. Gong, Elizabeth S.-F. Chao and James D. Fawcett (University of Nebraska)

1030 Testicular responses to different doses of melatonin in the lizard Anolis carolinensis . John R. Krouse, Frank J. Evans and James D. Fawcett (University of Nebraska)

1045 A preliminary look at the evolution of form and function in the costocutaneous muscle system in marine snakes. Bruce C. Jayne and Harold K. Voris (Field Museum of Natural History)

1100 The systematic significance of variation of the coccyx in some South American leptodactylid frogs. John D. Lynch (University of Nebraska-Lincoln)

1115 Effects of thermal and water stress on heart rate in Bufo americanus and Bufo marinus . Elizabeth Sherman Novotny (University of Vermont)

1130 Melanin deposits associated with the venom glands of snakes. F. Harvey Pough, G. Kwiecinski, and W. Bemis (Cornell University)

1145 Morphology of the neck region in Coluber constrictor (Serpentes: Colubridae). Gregory K. Pregill (University of Kansas)

1200 Seasonal ovarian histology of the Eastern Collared lizard, Crotaphytus collaris collaris (Say), from Arkansas. Stanley E. Trauth (Auburn University)

1215 --LUNCH --

WEDNESDAY, Aug. 11
Heritage Room

Contributed Paper Session
(Afternoon Session, Stephen R. Edwards, Museum of Natural History, University of Kansas, Presiding)

1330 Hormonal influences on calling and reproductive behavior in anura. Hans-Joachim Obert (Zoologisches Institut der Universitäet, Bonn, Germany)

1345 The influence of melatonin on reproductive state in male Callisaurus draconoides. Mary J. Packard and Gary C. Packard (Colorado State University)

1400 Color preference in Eumeces inexpectatus. Stephen A. Perrill (Butler University)

1415 Possible use of weak magnetic fields by orienting salamanders. John B. Phillips (Swarthmore College)

1430 The natural food and feeding behavior of a marine snake, Enhydrina schistosa (Hydrophiidae). Harold K. Voris and Helen H. Voris (Field Museum of Natural History)

1445 Sun compass orientation in four species of Ambystoma. Libby House Tomson (Mississippi State University)

1500 -- COFFEE BREAK --

1515 Ethology, Karyology and taxonomic position of the South American leptodactylid frog genus Edalorhina. James P. Bogart (University of Guelph, Canada)

1530 Variation and systematics of the Desmognathus monticola complex. Ronald S. Caldwell and George W. Folkerts (Auburn University)

1545 Biochemical systematics of Rana in western North America. Susan M. Case (University of California, Berkely)

1600 The Ameiva (Sauria, Teiidae) of trans-Andean South America: Trends in geographic variation and a new species. Arthur C. Echternacht (University of Tennessee)

1615 Evolutionary considerations of sizes and shapes in Giant Tortoises of the genus Geochelone in the Galapágos Islands. Thomas H. Fritts (San Diego Natural History Museum)

1630 Sperm morphology in the Hyla rubra group, and its bearing on generic status. M.J. Fouquette, Jr. and A.J. Delahoussaye (Arizona State University)

1645 Biogeography and distribution of Iguana and Cyclura in the Greater Antilles. Steven Garber (Cornell University)

1700 A computer approach to the biogrography of the herpetofauna of the Pacific lowlands of western Mexico. L.C. Garcia-Lozano and J.S. Godley (University of South Florida)

WEDNESDAY, Aug. 11
Towers Room

Contributed Paper Session
(Afternoon Session, Charles Chantell, University of Dayton, Presiding)

1330 Scanning electron microscopy of some salamander spermatozoa. J.W. Edward Wortham Jr. and Judith A. Murphy (Old Dominion University)

1345 The influence of light upon activity rhythms of five syntopic anuran larvae. Thomas J. Berger (University of Missouri) and James L. Vial (University of Tulsa)

1400 Breeding biology of the Cascade frog, Rana cascadae. Jeffrey Briggs (University of Wisconsin-Milwaukee)

1415 Species diversity of stream salamanders on two southern Appalachian watersheds with contrasting vegetation types. John E. Cadle (University of Georgia)

1430 Local geographic variation in demographic parameters and body size of Desmognathus fuscus (Amphibia: Plethodontidae). Rudolph Theodore Danstedt, Jr (University of Maryland)

1445 Patterns of mate-seeking and burrow use in a southern Florida population of Gopherus polyphemus. John F. Douglass (University of South Florida)

1500 --COFFEE BREAK--

1515 A population study of the northern watersnake, Natrix sipedon, in southeastern Michigan. Paul E. Feaver (University of Michigan)

1530 Ontogenetic shifts in food habits of a crayfish eating specialist: Regina alleni (Serpentes: Colubridae). J. Steve Godley (University of South Florida)

1545 Studies in larval amphibian habitat partitioning. W. Ronald Heyer (Smithsonian Institution)

1600 The identification of pedunculate barnacles found on Malaysian sea snakes with notes on their mode and site of attachment. William B. Jeffries and Harold K. Voris (Field Museum of Natural History)

1615 Effects of temperature and moisture on the foraging of Desmognathus ochrophaeus. W. Hubert Keen (Kent State University).

1630 Comparative demographic ecology of Desmognathus in western Pennsylvania. Anthony Krzysik (University of Pittsburgh)

1645 Studies on the polymorphic salamander Plethodon cinereus in New England: Ecological differentiation of the morphs and reproductive ecology. Fred Lotter and Norman J. Scott, Jr. (University of New Mexico)

1700 A field study of the northern prairie lizard, Sceloporus undulatus garmani. Luis Malaret (University of Kansas)

THURSDAY, Aug. 12
Heritage Room

Contributed Paper Session
(Morning Session, Dennis Ralin, Kentucky State University, Presiding)

0800 Protein evidence for a narrow zone of hybridization between the chorus frogs Pseudacris triseriata and P. nigrita. Donald F. Garthside and Herbert C. Dessauer (L.S.U. Medical Center)

0815 Systematics and evolution of Cnemidophorus tigris east of the Continental Divide. Fred S. Hendricks (Texas A&M University)

0830 Significance of morphological variation in three species of Desmognathus (Caudata: Plethodontidae). Eric J. Juterbock (Ohio State University)

0845 A biochemical and morphological analysis of the relationship of Plethodon longicrus and P. yonahlossee. Alvan A. Karlin, Sheldon I. Guttman, David M. Dennis and George M. Labanik (Miami University)

0900 Convergent evolution in the hylid frog, Anotheca. Linda Maxson (University of Illinois-Urbana)

0915 Chromosomes and the relationship of the scincid lizard Neoseps reynoldsi Stejneger. Roy W. McDiarmid and John W. Wright (University of South Florida)

0930 A gynandromorphic Cnemidophorus inornatus (Sauria: Teidae). Joseph C. Mitchell and M.J. Fouquette, Jr. (Arizona State University)

0945 Relationships within the genus Acris (Anura: Hylidae) in Alabama. William L. Phillips and Robert H. Mount

1000 -- COFFEE BREAK --

1015 Behavioral and genetic differentiation in a diploid-tetraploid cryptic species complex of treefrogs. Dennis B. Ralin (Kentucky State University)

1030 Identity of an enigmatic Eurycea (Urodela: Plethodontidae) from the Great Smoky Mountains of Tennessee. David M. Sever (Saint Mary's College)

1045 Chromosome evidence for the different phyletic lines in the frog genus Eusophus (Amphibia: Leptodactylidae). Alberto Veloso and Patricia Iturra (University of Kansas)

1100 A new species of plethodontid salamander from the California desert. David B. Wake and Ronald W. Marlow (University of California-Berkeley)

1115 The immunological comparison of caecilian albumins. Marvalee H. Wake and Susan M. Case (University of California-Berkeley)

1130 Enzymatic inheretance in the Queen Snake, Regina septemvittata. Craig Weatherby (Auburn University) and Sheldon I. Guttman (Miami University)

1145 Geographic variation in Sceloporus parvus Smith. Fred H. Wills (Texas A&M University)

1200 An analysis of rates of chromosome evolution and speciation in vertebrates. A.C. Wilson (University of California-Berkeley), G.L.Bush (University of Texas), S.M. Case University of California-Berkeley), J.L.Patton,(Univ Calif-Berkeley) and M. C. King (Univ Calif-San Francisco)

THURSDAY, Aug. 12
Towers Room

Contributed Paper Session
(Morning Session, David Snyder, Austin Peay State University, Presiding)

0800 Competition avoidance mechanisms in three species of Desmognathus. William T. Maple (Bard College)

0815 The occurence of neotenic rough-skinned newts (Taricha granulosa) in montane lakes of southern Oregon. Michael S. Marangio (Lousiana State University)

0830 Resource partitioning by lizards in a cave habitat. William J. Mautz (Cornell University)

0845 Preliminary remarks on introduced populations of frogs (Xenopus laevis) in Southern California. Michael J. McCoid (San Diego Natural History Museum)

0900 Geographic body size variation, life history, and growth among populations of a streamside salamander (Desmognathus brimleyorum) on adjacent mountains. Bruce Means (Tall Timbers Research Station)

0915 A demographic Study of the Chorus Frog, Pseudacris triseriata. Paul Miller (Colorado State University)

0930 Ecological study of Tropidurus peruvianus in southern Peru. Jaime E. Pefaur (University of Kansas)

0945 Reproduction and growth in the turtle, Trionyx muticus. Michael V. Plummer (Harding College)

1000 -- COFFEE BREAK --

1015 Physiological basis of habitat partitioning in Jamaican Eleutherodactylus. F. Harvey Pough, Margaret M. Stewart and Richard G. Thomas (State University of New York at Albany)

1030 The status of the Houston Toad, Bufo houstonensis. Okla W. Thornton and Robert A. Thomas (Texas A&M University)

1045 Comparative demography of Basiliscus basiliscus. Robert Wayne Van Devender (University of Michigan)

1100 Differential predation on tadpoles, metamorphosing individuals and frogs by garter snakes (genus Thamnophis). Richard J. Wassersug and Stevan J. Arnold (University of Chicago)

1115 Amphibian productivity in a northern Michigan pond. J. Kirwin Werner and Mark B. McCune (Northern Michigan University)

1130 Terrestrial activity of Kinosternon baurii in a seasonal hardwood swamp forest. Mark L. Wygoda (University of South Florida)

1145 The ecology of the bog turtle, Clemmys muhlenbergi, in western North Carolina. Robert T. Zappalorti (Staten Island Zoo)

1200 Selected aspects of the ecology of Rainbow snakes, Farancia erytrogramma. J.W. Gibbon, J.W. Coker and T.M. Murphy (Savannah River Ecology Laboratory)

1215 The evolutionary significance of overwintering in the nests by turtles. J.W. Gibbons and D.H. Nelson (Savannah River Ecology Laboratory)

ABSTRACTS

Symposium: Reproductive Biology of Amphibians

Arnold, Stevan J. (Department of Biology, University of Chicago, Chicago, Illinois). The Courtship Behavior of New World Salamanders.

There is a considerable body of descriptive work on the courtship behavior of New World salamanders, but little experimental analysis of function. Even the descriptive record is incomplete. We know nothing about courtship in the following genera: Phaeognathus, Leurognathus, Batrachoseps, Lineatriton, Oedipina, Thorius, Parvimolge, Gyrinophilus, Stereochilus, Typhlomolge, Typhlotriton, Haideotriton, Rhyacosiredon, Pseudobranchus and Siren. The published accounts of courtship in Necturus and Amphiuma are so incomplete that no meaningful interpretations are possible. The aim of this paper is to survey our knowledge and provide some inferences about function that may help to guide experimental investigations.

Some aspects of courtship have evolved rapidly, while other traits have had a very conservative history. Male actions that occur in the early stages of courtship seem particularly prone to rapid evolution. For example, the first reactions of the male to the female vary considerably between species in the genus Plethodon and in the genus Ambystoma. A specialized movement of the forelimbs is unique to the genus Desmognathus. Actions that occur later in courtship, particularly those associated with sperm transfer, seem to evolve slowly. The placement of the spermatophore is especially conservative. Salamanders in four families characteristically deposit the spermatophore just in front of the female's head. Other aspects of sperm transfer are characteristic of particular families (e.g., the tail-straddling walk of plethodontids, a right angle turn after spermatophore deposition in salamandrids, the number of spermatophores per courtship). We may be able to interpret such evolutionary patterns when our understanding of courtship functions is more complete.

There is surprisingly little experimental work on the phenomena of sex and species identification. Male Ambystoma and Plethodon recognize the sex of potential partners, but the mechanism is unknown. Chemoreception is a good candidate for the principal sensory modality used in sex identification. Capacity for species identification has been demonstrated experimentally in Taricha and Ambystoma. Species identification is made by chemoreception in Taricha. Nasolabial grooves and cirri may be used by plethodontids in sex and species identification.

Some male behaviors are apparently used to assay and change the female's sexual receptivity. Actions with these supposed functions are characterized by repeated application of glandular secretions. In plethodontids the mental gland is repeatedly applied to the female before and/or during the tail-straddling walk. Apparent delivery of mental gland secretions is accomplished in two ways: by applying the gland to the female's nares or by introducing the secretions into the secretions into the female's circulation by scratching with the premaxillary teeth. In some Ambystoma the male rubs his chin over the female's nares while clasping her dorsum. A similar action occurs in Taricha. Male Taricha have submaxillary glands, but Ambystoma have not been examined. In Notophthalmus genial glands are rubbed across the female's nares during clasping. Male Notophthalmus will delete clasping and use of the genial glands if the female is very receptive. A comparison of Ambystoma and Plethodon suggests that the probability of successful sperm transfer is related to the duration of preliminary courtship.

Behavioral interactions between rival males seem to serve two functions: defensive monopoly of the female (sexual defense) and usurpation of insemination (sexual interference). Male salamanders monopolize the female by transporting her away from rivals (Ambystoma, Taricha) or by chasing rivals away from her (plethodontids and Rhyacotriton). Covering the spermatophores of rivals (Ambystoma) and mimicry of female behavior (Ambystoma and Plethodon) are probably examples of sexual interference.

Berger, Leszek. (Polish Academy of Sciences, Poznani, Poland). Systematics and hybridization in the Rana esculenta complex.

The water frogs of Middle Europe form three morphological types of two of which, Rana lessonae Cam. and Rana ridibunda Pall., are species, while the third, Rana esculenta L. of intermediate features is their hybrid. Between R. lessonae and R. ridibunda there is ecological isolation: the first form lives in small water bodies and hibernates on land while the second form lives in lakes and rivers and hibernates in water. There is no genetic isolation between them which lead to their hybridazition in water bodies situated along the rivers and lakes. The distribution of these three forms in Poland, East Germany, Austria and Switzerland is much better known than in the rest of Europe.

Rana esculenta reproduces, as a rule, hybridogenetically. This means that the hybrid frog discards the entire set of chromosomes received from one of the parental species during meiosis. In mixed lessonae/esculenta population (L-E system) the individuals of the esculenta phenotype produce the gametes which contain only the entire set of R. ridibunda chromosomes, and in the ridibunda/esculenta populations (R-E system) their gametes contain the entire set of R. lessonae chromosomes. In northern Germany and Poland there are pure R. esculenta populations without the parental forms. These populations consist of 50-80 per cent triploids. According to Dr. Gunther's results one part of their gametes contain the sets of R. ridibunda chromosomes and the second part of R. lessonae. We know very little of their reproduction biology.

In populations which live near Poznań, Poland, the males of all three forms are heterogenous. Inheritance of the phenotype and sex within these populations is consistent with Mendel's rules in F_1 generations only (R. ridibunda x R. lessonae). In all further crosses and generations these features are hereditary according to the hypothesis of hybridogenesis. The exception to this rule is sex inheritance of which consistence with this hypothesis is found only in F_2 and in backcrosses B_1 with the individuals of both parental forms. The males of further generations of esculenta phenotype, as a rule, produces only femles.

The hybrids of esculenta phenotype and especially F_1 progeny of R. ridibunda x R. lessonae crosses, show a very strong tendency to migrate from their native ponds. This is not manifested by individuals of other phenotypes. Therefore, in all new artificial water bodies the esculenta individuals appear first and the frogs of other forms much later.

In natural populations near Poznań, Poland, about 75 percent of esculenta females produce eggs which are strongly differentiated. They are divided into two-, three- or even four-size classes. The causes of this phenomenon are not yet fully explained but we have proved that the individuals which emerge from the largest eggs are triploids. If these eggs are fertilized by lessonae sperm they have RLL genotypes and if by ridibunda sperm they have LRR genotypes. This proves that the larger eggs are diploid gametes of the LR genotype. These triploids have much better biological characteristics than the diploids produced by smaller eggs.

The phenotypic composition of froglets in natural populations in Poland depends on the composition of adults. In mixed lessonae/esculenta populations the metamorphosed froglets belong, most often, to three phenotypes: lessonae, esculenta and ridibunda. The individuals of the first two phenotypes consist of females and males in normal proportion 1:1, while the ridibunda froglets are, as a rule, only females which perish during hibernation under the ice cover. In mixed esculenta/ridibunda populations only the ridibunda froglets appear, but the proportions, females to males, are 1.5 : 1. In pure esculenta and ridibunda populations the progeny belong to ridibunda phenotype but in the first populations the female froglets only appear as a rule, and in the second ones the female and males are in normal proportions 1:1. We have not yet found, in Poland, a pure population of R. lessonae because this form lives always together with R. esculenta.

Capranica, Robert R. (Section of Neurobiology and Behavior, Cornell University, New York). Auditory Processing of Vocal Signals in Anurans.

Anurans are highly vocal animals. Their signal repertoire consists of a small set of distinct calls which play an important role in communication. Of these different sounds the mating call is the most obvious and best documented. In most species this call is made only by males at an appropriate breeding site during the reproductive season. Behavioral studies have verified that a female can

discriminate the calls of males of her own species. These experiments involve release of a receptive female midway between two loudspeakers through which recorded mating calls of various species can be broadcast. For a number of species it has been shown that females will selectively approach and make physical contact with the loudspeaker broadcasting the call of a conspecific male. Thus the mating call acts as a premating isolating mechanism to reduce crossbreeding between sympatric species. Behavioral studies of the male's discriminatory ability have involved an evoked calling paradigm. Males will vocalize in response to acoustic playback of mating calls of other males of their own species. The evoked calling behavior serves to establish a chorus and it may also play a role in maintaining spacing between neighboring males.

Analysis of recorded mating calls indicates that species-signaling involves both temporal and spectral characteristics. By employing synthetic calls, it has been possible to identify the exact features which allow some species to identify their own mating call. The detection of these features resides in major part on the sensitivity of the peripheral auditory system. The external eardrum is sensitive to airborne sound. Vibrations of the eardrum are coupled to the inner ear by means of a columellar middle ear. Within the inner ear are two separate auditory organs, the amphibian papilla and the basilar papilla. Electrophysiological recordings from the auditory nerve fibers which innervate the two organs reveal that the amphibian papilla is sensitive to lower frequency sounds while the basilar papilla is sensitive to higher frequency sounds. Thus the two organs are tuned to disjoint frequency ranges which vary between species and play a vital role in detection of the spectral features in species-specific sounds. Furthermore, not only is this matched sensitivity species-specific, it can also be geographically specific. In cricket frogs (Acris) the signal characteristics of the mating call vary with geographic origin. This is accompanied by a matched variation in the sensitivity of the peripheral auditory system. And a recent finding in Puerto Rican treefrogs (Eleutherodactylus coqui) indicates that there can also be a sexual dimorphism in the tuning of the inner ear. This sexual difference in peripheral auditory sensitivity is related to different features in the male's call which signal each sex separately.

Blankenhorn, H. J. (Zoologisches Institut und Museum der Universitat, Zurich, Switzerland). Reproduction and Mating Behaviour in Rana lessonae - Rana esculenta Mixed Populations.

From the results of Berger's studies on European green frogs in Poland, it is known that Rana esculenta Linnaeus is the hybrid between Rana lessonae Camerano and R. ridibunda Pallas (BERGER 1966-70). When the current study was gegun only R. esculenta had been described for vast parts of Switzerland. In the course of my dissertation studies at the University of Zurich, it was shown that all three types of green frogs, R. esculenta, R. lessonae and R. ridibunda occur in this region (BLANKENHORN, 1970). The natural ratio of the three phenotypes is peculiar. Out of 24 frog populations explored in the course of the work, only 3 were pure ridibunda populations, whereas 21 populations were lessonae-

esculenta mixed populations. Moreover, the ridibunda populations are not only divided geographically from lessonae-esculenta populations, but there is strong evidence, that ridibunda has been introduced between 1950 and 1970 by medical institutes using European ridibunda for Xenopus-tests. The frogs were then released near the city of Zurich.

The emphasis of my communication lies therefore on some causal and functional aspects of breeding behaviour of lessonae-esculenta mixed populations, on the presentation of ethological experiments on reproductive behaviour of R. lessonae and R. esculenta, and on speculations about the adaptivity of this "species-hybrid" system.

Reproduction in a natural lessonae-esculenta population - One population inhabited a gravel pit near Zurich and consisted of an estimated 220 individuals, 147 of which were individually marked. Fifteen to 20 animals were of lessonae phenotype. During the breeding season, the males gather together on a small traditional site in the pond and show increased activity and calling. At the highest intensity, some 100 males are crowded on a few square meters. The females come singly to this arena, copulate, lay their eggs in the center of the arena and leave. The distribution of the males in the arena is not random. In general, esculenta males form the center of the arena and lessonae males are found at the perimeter of the arena. Esculenta males showed a significantly higher proportion of aggressive behaviour than lessonae males, where sexual behaviour dominated. The overall activity diminished from the center to the edge of the arena. The copulation rate in lessonae males was more than twice as high as in esculenta males. A direct correlation between place in the arena, behaviour and breeding success is postulated. Some evidence for pairing preferences, especially for mating type lessonae-lessonae could be shown.
Experimental analysis of the mating behaviour of lessonae and esculenta males - In lessonae-esculenta mixed populations only lessonae-lessonae and lessonae-esculenta pairings give viable offspring, whereas esculenta-esculenta pairings give lethal offspring.

The basis for these experiments were the result of the analysis of both mating success and theoretical considerations which indicated that with a proportion of 1 lessonae individual to 10 esculenta in a population of 220 animals, mating by chance could not result in sufficient offspring of the essential lessonae-lessonae type. The questions to be answered were: 1. Are there intra- and interspecific pairing preferences? 2. Which type-specific activity patterns are correlated with such preferences? The experimental design consisted of all combinations balanced and crossed with the 2 types, lessonae and esculenta, 2 age classes, and 2 sex classes as independent variable. Thirty-six males and 36 females were tested in 3 series in 12 aquaria. The behavioural responses of the males in the presence of a female were recorded by using an ethogramme and taken as the dependent variable. A two-way-analysis of variance showed the following results: 1. Independent of age and type of male in the experiment, the older and larger esculenta and lessonae females were preferred over the younger and smaller ones (A-effect). 2. Independent of age and type of the females in the experiment, lessonae males showed more sexual activity; esculenta males showed more aggressive activity (B-effect). 3. Distinct preferences in form of AB interactions occurred in the following pairings:

young lessonae ♂ x old lessonae ♀
young lessonae ♂ x young lessonae ♀
old lessonae ♂ x old esculenta ♀

4. The following pairings were less frequent than expected (AB interaction):

young lessonae ♂ x old esculenta ♀
old lessonae ♂ x young lessonae ♀
old lessonae ♂ x young esculenta ♀
young esculenta ♂ x young and old lessonae ♀
young esculenta ♂ x young esculenta ♀
old esculenta ♂ x young and old lessonae ♀
old esculenta ♂ x young esculenta ♀

The following conclusions can be drawn: 1. lessonae males are more sexually active than esculenta males, 2. both esculenta and lessonae males prefer females that are larger (older) than themselves, 3. if the females are of the same size, lessonae males prefer females of their own type. These mechanisms play an important role in stabilizing lessonae-esculenta mixed populations.

Discussion: The lessonae-esculenta system - The function and adpative nature of the lessonae-esculenta populations are discussed in light of ecological, ethological, genetic, and faunistic considerations.

Halliday, T. R. (Animal Behavior Research Group, Oxford, England).
The Comparative Reproductive Ethology of European Newts: An Evolutionary Perspective.

An experimental analysis of the causal mechanisms underlying the sexual behaviour of the male Smooth newt Triturus vulgaris suggests that the temporal patterning of his behaviour is the result of an interaction between at least three causal factors, the nature and timing of the female's responses, the male's immediate capacity to produce spermatophores and his oxygen debt. A functional interpretation of male behaviour is that it has evolved so as to maximise opportunities for the transfer of spermatophores to the female in the time available, which is largely constrained by his ability to sustain sexual activity without ascending to the surface for a fresh supply of air, thus losing contact with the female. Other factors which may have been important in the evolution of Triturus sexual behaviour are the opportunities that it provides for each sex to assess the other's quality as a prospective mate and the role that courtship display may play in the prevention of hybrid matings. It is suggested that a number of behavioural and morphological characters of the male may be the result both of sexual selection exerted by the female and of the fact that reproductive isolation appears to be primarily due to female selectivity.

Particular attention is given to the relationship between T. vulgaris and the closely related Palmate newt T. helveticus. It is suggested that a number of behavioural and morphological differences between these species have evolved in association with an ethological isolating mechanism based on female recognition of male display which has evolved secondarily to genetic incompatibilities between these species.

The sexual behaviour patterns of a number of Triturus species are compared. On the basis of this comparison these species can be divided into three subgeneric groups which show a close concordance with taxonomic relationships based on morphological characters and on known genetic affinities.

Comparison of Triturus sexual behaviour with that of the closely related genera Notopthalmus, Taricha and Cynops suggests that Triturus represents the extreme expression of a trend towards increased female freedom of movement during sexual behaviour. A parallel trend has occurred in a number of animal groups, including, among the Urodeles, the Ambystomatids and the Plethodontids.

Houck, Lynn D. (Museum of Vertebrate Zoology and Department of Zoology, University of California, Berkeley). Reproductive Biology of Neotropical Salamanders.

Neotropical salamanders, originally thought to be a monogeneric group of low profile, actually are highly diverse and abundant. Nearly one-half of all living salamander species occur in the neotropics. All are pletohdontids and all have terrestrial eggs which develop directly into the adult form. This paper considers the reproductive patterns of neotropical salamanders found in a variety of habitats and elevations, and compares these patterns with those of temperate zone plethodontids having direct development.

The overall reproductive pattern observed in most neotropical species is generally similar to that of temperate plethodontids. Reproductive variables which are similar in tropical and temperate species include: (1) Age at first reproduction is approximately $2\frac{1}{2}$ - $4\frac{1}{2}$ yrs., depending on adult size. (2) Females are larger (and thought to be older) than males at first reproduction. (3) Average adult size is larger in females than in males (although most extreme cases of sexual dimorphism occur in neotropical species). (4) Growth rate of juveniles is roughly 15 mm/yr. (5) Females oviposit biennially in all areas where surface activity is restricted during many months of the year. (6) Clutch volume is roughly comparable for females of similar size. (7) There is a positive and statistically significant correlation between standard length and clutch size. (8) For females of a given standard length, variation in clutch size is high. (9) The sex ration is 1:1 (see below for one exception).

There are also substantial differences in reproduction between neotropical and temperate salamanders: (1) Aseasonal oviposition (and its ramifications) has been documented for three neotropical species. Such aseasonality is extremely rare, and has never been observed for extra-tropical salamanders. (2) Spermatogenesis, the development of male secondary sexual characters, and courtship activities all are aseasonal in each neotropical species examined to date. Once males become sexually mature, they produce viable sperm and are phsyiologically prepared to court at any time of the year. Temperate salamanders have definite cycles of spermatogenesis and courtship. (3) Clutch size in many species of Bolitoglossa is 2-3 times that of similarly-sized temperate plethodontids. Egg size in these Bolitoglossa species is relatively smaller. (4) Neotropical females brood egg clutches for about 4-6 months, compared with 2-3 months for North American females. (5) Females in the eastern U. S.

brood eggs during wet summer months when other salamanders are active. Females in the western U. S. and the neotropics brood eggs during dry season months when surface activity is restricted for all salamanders. (6) The sex ratio in Chiropterotriton bromeliacia (a small, arboreal, neotropical species) apparently is 3o :1o.

Salamanders in any area primarily are constrained by local moisture and temperature regimes. Overall climatic patterns govern activity cycles and therefore growth rates and optimal timing of oviposition. Within broadly similiar patterns of activity, a comparison between neotropical and temperate plethodontids reveals striking differences in clutch size, egg size, seasonality of spermatogenesis and courtship, and length of time spent brooding eggs. These variables provide a measure of flexibility in life history patterns and probably allow the "fine-tuning" necessary for optimal adaptation to local conditions.

Kawamura, Toshijiro and Midori Nishioka. (Laboratory for Amphibian Biology, Hiroshima University, Japan). Aspects of the Reproductive Biology of Japanese Ampbhibians.

In the four main islands of Japan and the Island of Tsushima situated between Japan and Korea, sixteen anuran and about fifteen urodelan species are found. Of the anuran species, Rana nigromaculata and R. brevipoda are pond frogs allied to Rana esculenta. Six other species, Rana japonica, ornativentris, tagoi, chensinensis, tsushimensis and dybowskii, are brown frogs allied to Rana temporaria, although Rana tagoi differs from the others in many respects. In addition to these species, two, small, dark-colored frogs Rana rugosa and R. limnocharis and a large American frog Rana catesbeiana are widely distributed. Species belonging to genera other than Rana are: Hyla arborea japonica, Bufo bufo japonicus and three species Rhacophorus. While it is generally believed that Bombina orientalis is distributed in the Island of Tsushima, it has not been recently found on this past island. In the past ten years, Kawamura and his collaborators have studied various problems relating closely to the reproductive biology by making use of most of the Japanese anuran species and some foreign ones. An outline of the results obtained by us will be reported here.

1. The sex of gynogenetic diploids. Gynogenetic diploids were produced in six species, Rana nigromaculata, Rana brevipoda, Rana japonica, Rana rugosa, Hyla arborea japonica and Korean Bombina orientalis. In these species, the sex is completely differentiated at the stage immediately after metamorphosis. While the former four species are of a semi-differentiated type, the other two are gonochorists. If the male is heterozygous (XY) in sex-determining mechanism, all the gynogenetic frogs are genetically females (XX), as their diploidy is established by fusion of the two haploid nuclei produced by the second maturation division. If all the gynogenetic frogs are females, it is inversely presumed that the male of this species is heterozygous. As the result of experiments, it was found that a few males are always produced together with a great many females in the four Rana species. The males are genetic females whose sex was reversed. Such sex-reversed males are more numerous in brown frogs than in pond frogs. In an exceptional case, all the gynogenetic diploids produced from a female Rana nigromaculata were males. In Hyla and Bombina, sex reversal does not seem to occur; all the gynogenetic diploids are females.

2. Effects of sex hormones. The fact that the sex reversal of genetic females into males occurs by administration of androgen, and that nearly all the offspring of sex-reversal occurs from males into females by administrationof estrogen in Hyla arborea japonica. In Bombina orientalis, no sex reversal occurs by administration of androgen or estrogen.

3. YY males in the field. If the male is heterozygous (XY) in the Japanese tree-frog, YY males as well as sex-reversed females should be found out in the field, since sex reversal occurs from males into females in this species. Three of 14 male albinos collected from the field in the past ten years were actually those that were considered to be YY in sex-determining mechanism. Moreover, a female used in the control of an experiment was presumed to be XY.

4. The sex of haploids and polyploids. The sex of 18 haploid frogs and metamorphosing tadpoles of Rana nigromaculata has been reported by Miyada (1960). While 14 of them were females, one was hermaphroditic and the remaining three were males. Many haploid frogs can easily be produced by pseudo-fertilization in Rana rugosa. Within one month after metamorphosis, most of the haploid frogs in Rana nigromaculata and Rana japonica were repeatedly reported by Kawamura and his collaborators. In Rana rugosa, all the triploids become males within one month after metamorphosis. No sex-reversal occurs in triploid Bombina orientalis. The sex and reproductive capacity of auto- and allotetraploids frogs have been reported by us (1960, 1963, 1967).

5. Interspecific hybrids. Many kinds of crosses have been made among Japanese, Korean, Formosan and European allied species of pond frogs as well as of brown frogs, by Kawamura and his collaborators. In pond frogs, nine species and subspecies are completely or incompletely isolated from one another by hybrid inviability of hybrid sterility. Eight species of brown frogs are completely isolated from one another by gametic isolation, hybrid inviability or hybrid sterility; mature hybrids are all sterile males.

6. Effects of irradiation. First-generation offspring were produced from spermatozoa or uterian eggs irradiated with X-rays (90 - 250 rads) or neutrons (50 - 250 rads) by fertilizing with untreated gametes in Rana nigromaculata and R. japonica. From males and females of the first-generation offspring, second-generation offspring were produced by mating with frogs collected from the field. Third- and fourth-generation offspring were produced in turn by the same procedure. In all four generations, sex reversal of females into males occurs frequently. Beside these experiments, second- and third-generation offspring were produced from female first-generation offspring by applying the method of diploid gynogenesis in Rana nigromaculata. Although all these offspring are genetically females (XX), sex-reversed males always appear in a high percentage in each experimental series. Sex reversal occurs far more frequently in the series of frogs derived from gametes irradiated with X-rays than that in the series from gametes irradiated with neutrons.

Littlejohn, M. J. (Department of Zoology, University of Melbourne, Parkville, Victoria, Australia). Divergence, Convergence and Stability in Anuran Acoustic Signaling Systems Concerned with Reproduction.

An evolutionary approach will be adopted and the selective forces moulding the structure and function of the anuran acoustic communication system examined with respect to: species-specific mating systems, male territoriality, and identification of sex and reproductive state.

In particular, the following aspects will be considered:

1. Constraints on the evolution of such systems including the properties of the atmosphere as a communication channel, morphology and physiology of emitter and receiver, degree of channel utilization, requirements for directionality and range, and evolutionary history.

2. Divergence, mainly in the male mating call-conspecific female response system, with regard to the significance of reproductive character displacement, differences in acoustic environments, sexual selection, and drift/founder effects.

3. Selective components leading to convergence of acoustic signals and associated adaptive responses including interspecific territoriality, post-interactive allopatric release, mimicry, introgressive hybridisation and optimisation of systems for maximal efficiency, directionality and range.

4. Degree of geographic stability in mating-call structure in wide-ranging taxa with respect to the importance of genetic canalisation, gene-flow and uniformity of selective regimes.

5. Intraspecific variability due to differences in temperature and body dimensions (ontogenetic and selected).

An integrated approach to the evolution of systems of acoustic communication will be attempted at intraspecific, interspecific and community levels, by considering: allopatric, parapatric, hybridising and sympatric populations of wide-ranging species complexes, and multi-species breeding aggregations. Examples will be drawn from the anuran faunas of southern Australia and North America, with a review of progress over the last 25 years in the utilisation of objective descriptive, experimental and comparative techniques in the study of sound communication.

Finally, the contributions of acoustic studies on anurans to the understanding of the origins, evolution and maintenance of selective mating systems (premating reproductive isolation), and the partitioning of reproductive resources, as critical aspects of vertebrate speciation, will be assessed.

Mancino, Giorgio. (Instituto di Zoologia dell Universita, Pisa, Italy). Cytotaxonomic and Cytogenetic Investigations in European Newt Species.

The European salamandrids share an equal chromosome number (n = 12, 2n = 24) and mitotic karyotypes of largely uniform size and morphology - all being symmetrical and unimodal. The differences sometimes noted in the morphology of the mitotic chromosomes are not so prominent as to allow deductions about the mechanisms involved in the process of speciation and karyological evolution.

On the other hand, a detailed study of giant lampbrush chromosomes of a number of salamandrid species has revealed that the karyotypic uniformity assumed by several authors to occur in the family Salamandridae is somewhat illusory. Each species so far examined has lampbrush chromosomes characterized by landmarks which can differ from each other in number, morophology, texture and position along the chromosomes. The differences are likely due not to large-scale scale structural rear rangements (such as large inversions and translocations), but to evolutionary changes in single genetic loci. Therefore, it is impossible to define these Urodele species complexes as "homosequential". Further evidence from in situ hybridization techniques tend to indicate that, as far as 28S + 18S and 5S rRNA genes are concerned, even closely related newt species exhibit a rate of great variation of the pattern of gene localization. A wider use of the in situ hybridization technique can lead to a better knowledge of the gene distribution at the chromosomal level.

At present, evidence obtained by the use of the C-staining method for a differential banding pattern of specific regions of both mitotic and lampbrush chromosomes has appeared as a suitable means for cytotaxonomic and cytogenetic studies. To this end, interspecific Triturus hybrids have been revealed as an appropriate biological system: in fact, the most reliable chromosomal analyses are those where two different specific genomes are examined in the same hybrid individuals, providing definitive information on chromosomal homologies and genetic similarity between the parental species.

Nickerson, Max A. (Milwaukee Public Museum, Wisconsin). Reproductive Biology of Paedogenic Salamanders.

No Abstract Received.

Schneider, Hans. (Zoological Institute, University of Bonn, Germany). Auditory Behavior and Physiology of Vocalization in the European Tree Frog, Hyla arborea (L.)

In Southern Germany the calling period of the tree frog Hyla arborea arborea (L.) begins in the first days of May and usually continues into the first half of July. The males begin calling at consistent times in the evening; calling activity lasts until about midnight, unless the air temperature falls below the threshold of 8°C. Mating calls are usually given in series of 15-30 calls. With few exceptions each call comprises nine pulses; the amplitudes of successive pulses gradually rise to a maximum and then decline relatively rapidly. The tree frog's repertoire includes a number of calls in addition to the mating call: the territorial call, male release call and distress call. As temperature rises there is a systematic decrease in duration of the mating call and of the intervals between calls. The other European tree frogs also give mating calls with very distinctive characteristics. Knowledge of the details of the different mating calls and the influence of temperature upon them provides a useful criterion for evaluating the systematic status of the European tree frogs.

The sound-producing apparatus of the tree frog consists of the laryngeal skeleton together with the vocal cords and four pairs of muscles. The tree frog has the largest larynx, with respect to its body size, of all European anurans. In the female the larynx is only one-third, or at most half, as large as in the male. Electron-microscopic examination has shown that the fine structure of all the larynx muscles of male tree frogs is the same and identifies them as very fast muscles; the muscle fibers are very thin, the sarcoplasmic reticulum is massively developed, the mitochondria and the motor endplates are very numerous, and the larynx muscles contain a great deal of fat. The physiological properties revealed by experiments with electrical stimuli are also significant. At 6°C 30-50 stimuli per second suffice to put the muscle into smooth tetanus, whereas at 24°C 240-260 stimuli per second are required. The larynx muscles of the females are much slower, since a smooth tetanus is produced by 30 stimuli per second at 10°C, and by 80 stimuli per second at 20°C.

Histological studies of Hyla a. arborea have resulted in an atlas of the brain based on a stereotaxic system which permits localization of each point in the brain and identification in terms of its coordinates. Extensive experiments in which the brain of Hyla arborea savignyi Audouin was stimulated electrically have shown that the preoptic region of the diencephalon is extremely important in central-nervous control of sound production. Stimuli applied in this region elicit prolonged calling activity. The electrically elicited mating calls in some respects differ only slightly from natural mating calls.

Tilley, Stephen G. (Department of Biology, Smith College, Massachusetts). Reproductive Ecology of North American Plethodontids.

The literature on life histories of North American plethodontid salamanders has been expanding in recent years. This owes largely to an expanding interest in all aspects of the biology of these animals, and in the study of life histories and their adaptive natures. The relative ease of obtaining large series of many plethodontid species, and the ease with which these series yield data pertinent to the study of life histories and reproductive ecologies, make plethodontids attractive organisms for such studies.

Consideration of the state of our knowledge of North American plethodontid life histories is facilitated by first enumerating some of the goals of life history studies. We can then evaluate current methods of obtaining, analyzing, and interpreting data in the light of these goals. Most life history studies seem to be driven by at least one of the following:

1. Interest in clarifying the life history of a particular organism. Investigators who find themselves unstimulated by the socio-economic or agricultural importance of organisms may find themselves attracted to plethodontid salamanders, which combine obsecurity, beauty, and abundance in unique ways.

2. Interest in the phenomenon of adaptation. The adaptive nature of many phenotypic characters is obscure because correlations with Darwinian fitnesses are usually obscure. This is not generally

true of life history studies, which attempt to measure components of fitness directly and interpret them as adaptive strategies.

3. Interest in the importance of plethodontid populations as components of the ecosystem they inhabit. Plethodontids are often among the most abudnant vertebrates of terrestrial communities. This may reflect their importance as movers of energy and nutrients, or regulators of their predators or prey.

4. Interest in the implications of reproductive and life history patterns for the genetic structure and differentiation of populations.

These implications seem to have largely escaped attention, but will assume importance as techniques for quantifying levels of genetic variation and divergence continue to be assimilated by population biologists.

Studies of reproductive patterns and life histories of plethodontids are still largely at a descriptive level, but we can inquire whether the data currently being generated can be usefully applied to any but the first of the above goals. In fact, most studies suffer from a number of weaknesses.

Hopes of applying studies of plethodontids to understanding adaptation and ecosystem function are hampered by difficulties in obtaining data on three parameters: age-specific survivorship, age-specific fertility, and age at first reproduction. Such data are critical to understanding the adaptive nature of life histories and the productivity of populations. The limitations of most studies stem from their reliance on serial, "vertical" sampling of populations, rather than on long-term, capture-recapture studies that yield more direct estimates of critical parameters. Few plethodontid populations lend themselves to capture-recapture studies, and few biologists seem willing to invest more than a few years (or more than the usual time required to produce a dissertation) in the study of a single population or species. This leads to estimating age from testis lobation, survivorship curves from age structure, age at maturity from juvenile body size distributions, and oogenic cycles from distributions of ovarian follicle sizes in chronological samples. In some cases these estimates may be sufficiently accurate for first approximations, but important phenomena may be obscured. An example is our tendency to interpret follicle size data in terms of annual vs. biennial oogenic cycles, ignoring the possibility that individual animals may not fit either. An additional problem is that when life history data are available, they are often interpreted as reflecting "r-selection" or K-selection," or some combination thereof. Any life history can be positioned somewhere on the "r-K continuum," but thus positioned it is not necessarily explained or sufficiently interpreted from an evolutionary point of view.

Long-term studies of two populations of Desmognathus ochrophaeus illustrate the application of capture-recapture methods of plethodontid populations that do happen to lend themselves to these techniques. These studies elucidate features of this species' life history and population biology that have previously been investigated much more indirectly, such as the relationship between age and testis structure, variation in age at maturity among popu-

lations, and details of the oogenic cycle. It is also possible to compare the turnover of young and old males in populations, and this lends to speculation on the significance of competition among males for opportunities to inseminate females. Discussions in this area will be speculative until information is available relating ages of males to numbers of spermatophores produced, numbers of sperm per spermatophore, probability of success in courtship, and probability of emigration or successful migration to a new population. Such information bears heavily on understanding the effective breeding sizes of populations, levels of genetic variation they can support, and levels of genetic isolation among them, and illustrates the bearing of reproductive studies on our understanding of evolution within a species.

Wake, Marvalee H. (Department of Zoology and Museum of Vertebrate Zoology, University of California, Berkeley). The Reproductive Biology of Caecilians.

The reproductive biology of caecilians (Amphibia: Gymnophiona) is reviewed and new data are provided. Caecilian reproduction differs considerably from that of other amphibians. Fertilization in all species is internal, and effected by a male intromittent organ which is the everted posterior part of the cloaca. Little is known of courtship or mate selection and recongition.

A number of caecilian species are live-bearers, in contrast to the very few species of anurans and of urodeles. Some members of the Caeciliidae and probably all members of the Scolecomorphidae and Typhlonectidae are viviparous. Most live-bearing species are lowland, ranging from sea level to 2500 m. Clutch size and ovum size are reduced in these species relative to egg-layers. Developing young are retained in the oviducts through metamorphosis. One to twelve young may be born. The yolk supply is exhausted relatively early in development, and the fetuses feed on material secreted by the oviducal epithelium. Fetuses have a morphologically species-specific dentition that appears to be used to scrape the oviducal lining, stimulating secretory activity. The fetal dentition is lost just before or very shortly after birth and the adult dentition quickly erupts. The thin, highly vascularized skin and the gills (paired and triramous in caeciliids and scholecomorphids, paired and sacciform in typhlonectids) are appressed to the oviducal wall and probably function in gaseous exchange. Gills are resorbed before birth. Typhlonectid young are born in fresh water, fully able to swim and to breathe air.

Several species (all ichthyophiids, by definition, and some caeciliids) are terrestrial egg-layers. The clutch is laid in a burrow or under ground cover near a stream, and maternal brooding has been noted for several species. Larvae hatch from the eggs and wriggle to the stream. Larvae have triramous gills, a lateral line system, and an adult-type dentition.

Reproduction in most caecilian species appears to be cyclic. The spermatogenic cycle is documented only for Gymnopis multiplicata, but evidence indicates that many species have a similar pattern.

The male Mullerian ducts remain functional, correlated with spermatogenic activity. The posterior portion of each duct becomes glandular during the period of spermatogenesis, and subsequently regresses. It is hypothesized that the secretion provides a fluid vehicle for sperm transport in a terrestrially evolved internal fertilization system.

In species for which adequate samples are available, ova in all mature females are at the same vitellogenic stages, suggesting seasonal reproduction. The fully yolked ova of certain egg-laying species are among the largest in amphibians, measuring 10 x 7 mm. Evidence for one viviparous species (Geotrypetes seraphini) indicates that age at first reproduction may be two years. Data suggest that gametogenic activity in both sexes of several species occurs each year, though the interval may be greater for females of some species. Birth of young in several terrestrial species occurs at the inception of the rainy season, suggesting that reproduction is seasonally correlated with moisture and food optima. However, larvae at various stages of development occur at certain sites throughout the year, indicating that some lowland egg-laying species may be acyclic.

Wells, Kentwood, D. (Smithsonian Tropical Research Institute, Canal Zone). The Evolution of Courtship Behavior in Frogs.

Anuran courtship includes long range and short range courtship. Long range courtship usually involves production of acoustic signals that are broadcast at large by males and are not directed at particular individuals. Short range courtship involves signals directed at particular individuals. Most male frogs have advertisement calls that attract females and sometimes serve other functions such as territorial advertisement. Males in large choruses must compete with other calling males for the attention of females. Males may increase their chances of obtaining mates by 1) alternating calls with neighboring males, thus reducing acoustic interference; 2) changing the temporal pattern of calling as male densities change; 3) producing more complex calls as male densities increase; 4) parasitizing other calling males; or 5) abandoning acoustic signaling and switching to an active search stragegy. Similar behavioral strategies are employed by many acoustical insects.

Short range courtship usually involves changes in call rate or call intensity in response to approaching individuals, production of special courtship calls, or the use of tactile and/or visual signals. These signals may provide more directional information to females at close range and enable them to find individual males more easily. Short range courtship calls are often softer than advertisement calls, perhaps enabling a male to attract nearby females without eliciting similar courtship calls from competing males. Short range courtship signals may be particularly advantageous in situations where vocal competition among males is intense.

Complex courtship involving exchange of signals between males and females at close range is relatively rare in frogs. Such behavior has been reported in the midwife toad, some leptodactylids, and

many pipids and dendrobatids, and it may occur in other species as well. Females of some species respond to male calls with calls of their own. Tactile interactions are important in pipids and dendrobatids, and visual cues seem to be very important in dendrobatids, all of which are diurnal. Dendrobatid courtship often includes elaborate postural displays, rubbing and other tactile signals, circling of one partner by the other, and leading of one frog by the other to the oviposition site.

Complex courtship often occurs in species with prolonged breeding periods in which males and females live together in the same habitat for much of the year. Males encounter both receptive and non-receptive females, and complex courtship may be important in enabling a male to determine the willingness of each female to mate. Furthermore, in some species, females may require repeated courtship attempts by males before they will mate, and sexual selection may favor prolonged or elaborate courtship by males. When both sexes are territorial, as in some dendrobatids, complex courtship may be important in enabling one sex to overcome the aggressive responses of the other sex to territorial intruders. A partial reversal of the usual sex roles in courtship, with females taking the more active part, may have occurred in some dendrobatids in which males assume the primary role in parental care. The relationship between parental investment and courtship behavior needs to be investigated in more detail.

CONTRIBUTED PAPERS

Auburn, Jill Shore and Douglas H. Taylor. (Miami University). Orientation by Means of Polarized Light in bullfrog tadpoles, Rana catesbeiana.

Bullfrog tadpoles trained indoors in tanks with plane-polarized light projected onto the shoreline oriented predictably when tested indoors in a circular arena illuminated by polarized light. Rotation of the plane of polarization in the test arena resulted in a similar rotation of the angle of orientation, demonstrating that these animals can perceive plane-polarized light. Tadpoles trained in outdoor tanks with gravel shorelines oriented predictably when tested outdoors at sundown when the sun was below the horizon and only clear blue sky was visible. Polarized light, which is prevalent in clear blue sky, especially at sunrise and sunset, is implicated as a cue in this response. Experiments are currently being performed, both outdoors under the natural sky and indoors under artificially polarized light, to investigate the use of plane-polarized light in amphibian orientation.

Berger, Thomas J. (University of Missouri) and James L. Vial (University of Tulsa). The Influence of Light Upon Activity Rhythms of Five Syntopic Species of Tadpoles

Environmental communities demonstrate an inexorable pattern of rhythmicity. Diel activity patterns are known to be influenced by a number of physical factors; among the most conspicuous is light. Many species of anuran larvae occur syntopically and

demonstrate similar ecological requirements. To determine the possible role of light in modulating circadian rhythms among tadpoles, the activity patterns of five species of syntopic larvae (Rana catesbeiana, R. pipiens, R. clamitans, Pseudacris triseriata, and Bufo americanus) were studied under exposures of alternating light-dark (LD 14:10), continuous light (LL), and continuous darkness (DD). The data obtained in this research suggest that larvae of four species (R. catesbeiana, R. pipiens, R. clamitans, and P. triseriata) may lessen the interspecific competitive pressures as a result of light-cued temporal differences in their diel activity rhythms. A fifth species (B. americanus) may use the presence or absence of light in conjunction with other biotic and abiotic factors for cueing and maintaining rhythms during its larval period.

Bogart, James P. (University of Guelph). Ethology, karyology and taxonomic position of the South American leptodactylid frog genus Edalorhina.

Information obtained from a population of Edalorhina perezi from amazonian Peru indicated that E. buckleyi is a synonym of E. perezi. Comparisons were made between E. perezi, representatives of the four species groups of Physalaemus, Lithodytes lineatus, and Pleurodema. The results indicated that Edalorhina is most similar to some species of Physalaemus and should be included as a fifth species group in that genus.

Briggs, Jeffrey. (University of Wisconsin). Breeding Biology of the Cascade Frog, Rana cascadae.

The breeding behavior of Rana cascadae was observed from 1966 through 1970 in the Cascade Mountains of Jefferson County, Oregon. The frogs overwinter in the mud in the bottom of ponds or surrounding spring saturated ground. Breeding activity begins with the emergence of the males as soon as the ice begins to melt in the breeding ponds. Males call from dead, floating vegetation and from a floating or swimming position in open water. One male was observed calling under water. Three call types are analysed. 1. Series clucks - average duration = 0.0587 s. 2. Double clucks - duration = 0.0480 s. 3. Mew call - duration = 0.292 s. Release calls were heard but not recorded. Amplexus is axillary and more than one male (up to 5 observed) may clasp a female at once. The eggs are deposited in water less than 7 cm deep and usually at traditional sites at the waters edge. Many egg masses at the site fuse into a single large mass with the jelly swelling to protrude from the surface of the water. Breeding biology is most similar to Rana pretiosa of the Pacific Northwest Rana complex.

Cadle, John E. (University of Georgia). Species Diversity of Stream Salamanders on Two Southern Appalachian Watersheds with Contrasting Vegetation Types.

The relative abundances and species diversities of stream salamanders were compared between two watersheds, one covered by a natural hardwood forest, the other by a pine monoculture. Species diversities were not significantly different on the two watersheds. The species compositions of the two salamander communities, however, were different. Desmognathus ochrophaeus was the most abundant stream salamander on the hardwood watershed, while D. monticola, D. ochrophaeus, and D. fuscus were more nearly equally abundant on the pine watershed. These differences are interpreted to be indirect effects of vegetation ocer on the two salamander communities.

Caldwell, Ronald S. and George W. Folkerts. (Auburn University). Variation and Systematics of the Desmognathus monticola complex

Desmognathus monticola ranges widely, occurring from Florida, north to Pennsylvania. A number of the populations are disjunct. Desmognathus welteri may be a member of the D. monticola complex, since it resembles D. monticola in many respects. Further work is needed to clarify the status of D. welteri. The past migrational patterns have complicated variation in this species and circular overlap may exist. The subspecies D. monticola jeffersoni is weakly differentiated for adjacent populations of D. m. monticola, and several other populations of monticola are qually distinct. Some problems have been encountered in the past because workers were unable to separate D. monticola from D. fuscus.

Carpenter, Charles C. (University of Oklahoma). Chameleons of Madagascar: (A motion picture film by the late Dr. Stephen R. Parcher).

Case, Susan M. (University of California). Biochemical Systematics of Rana in Western North America.

Electrophoretic and immunological techniques have been used to reassess the evolutionary relationships among species of Rana native to western North America. Data indicate that R. aurora, R. boylei, R. cascadae, R. muscosa, and R. pretiosa are closely related and form a separate lineage allied more closely with the Eurasian R. temporaria than with other North American ranids. Rana tarahumarae, previously thought to be allied with R. boylei and R. muscosa, is not related to these two species. It is part of a Mexican radiation derived from an early off-shoot of a pipiens stock.

Casebere, Debra C. and Douglas H. Taylor. (Miami University). Life History Phrenomena in the American Toad, Bufo americanus.

The ontogeny of tadpole orientation behavior and its relation to a possible disassortative mating system in the american toad was investigated. Approximately 15,000 toad eggs were placed along a selected shoreline in an enclosed pond. Upon hatching, weekly orientation tests were performed in an outdoor arena. The development of orientation abilities in the tadpoles was related to possible life history consequences.

Clark, Brian D. (University of Michigan). Analysis of Aerial Locomotion of 4 Ptychozoon lionatum was studied by cinematography. In flight the limbs are outstretched. Patagium extenion is correlationed with a marked dorso-ventral compression of the grunk while air resistance serves to tense the outstretched membrane. Take offsfrom a hoizontal surface were usually close to horizontal, but diving take offs followed by slight horizontal flairing were frequently observed. A constant velocity with the body more or less horizontal was usually attained after a 3 m height loss. At constant velocities, the path of descent ranged from 40° to 90° below horizontal and was determined by the magnitude of the horizontal velocity gained in flairing out of dives) and terminal vertical velocity. Terminal vertical velocity can be predicted from standard equations for parasite drag (profile drag). The coefficient of parasite drag, which depends primarily on the shape of the body, was approximately 1.1. In steady flight, the anatomical and behavioral specializations for aerial locomotion in Ptychozoon lionatum create high drag forces which serve only to retard descent as in man-made parachutes. This distinguishes Ptychozoon from gliding lizards, such as Draco, and probably from the gliding mammals, all of which create lift forces with essentially the same morphological traits seen in Ptychozoon.

Crump, Martha L. and Stanley N. Salthe. (Brooklyn College of City University of New York). Natural Selection and Anuran Locomotion.

The intrinsic variability of traits proposed by previous authors as being important in frog locomotion was compared with the intrinsic variability of other hindlimb traits and was found to be significantly less variable. This is taken to signify more intense selection upon the former. In a nonjumper, Atelopus, the ratio femur/tibfib is not less variable than other hindlimb traits as it is in a jumber (Acris). A new ratio (foot/tibfib) is suggested as being of importance in both styles of locomotion. The ratio tarsus length/snout-vent length is suggested as being primarily under the influence of genetic drift in Atelopus. Clinal variability as noted by other authors in Acris is corroborated.

Cushman, Janette R. and Gary C. Packard. (Colorado State University). Concentrations of Lactic Acid in Neotenic and Transformed Tiger Salamanders (Ambystoma Tigrinum) Before and After Activity.

Concentrations of lactic acid in bodies of inactive neotenic tiger salamanders were similar to those recorded for inactive transformed animals. Transformed salamanders swimming against a water current for 5 min accumulated significantly mor lactic acid in their body fluids than did neotenic salamanders, but subsequently metabolized the lactate at higher rates than characterized neotenic animals. Total body lactate in both morphs decreased rapidly in the first 1½ hrs after activity, and within 6 hrs had returned to the level (common to both morphs) observed prior to activity.

Dalrymple, G. H. (Ohio State University). Durophagic Adaptations of Dracaena guianensis.

Modifications of the jaw mechanism of the caiman lizard, Dracaena guianensis (family Teiidae), for durophagy (feeding upon hard-shelled foods) are described on the basis of comparisons with its close relative Tupinambis. Adaptive interpretations of skull modifications can be posed in terms of enlargement of sites for jaw muscle attachments and strengthening of the palatal architecture for the crushing mode of feeding. The distinctively flared quadrate allows for enlargement of the Add. mand. externus muscle, resulting in improvement of the mechanical advantage of the muscle as well as reinforcement of the jaw articulation. Study of the dentition in relation to size reveals that enlarged and flattened teeth are present even in smaller lizards and are not the result of ontogenetic alteration as in Varanus niloticus. The state of the constrictor dorsalis muscles and the intracranial joints indicate that cranial kinetic motions may occur during feeding. These findings necessitate re-evaluation of theories of the adaptive significance of cranial kinesis in lizards.

Danstedt, Rudolph T. (University of Maryland). Local Geographic Variation in Demographic Parameters and Body Size of Desmognathus fuscus (Amphibia: Plethodontidae).

Life history and related demographic parameters are compared among six Maryland populations of the dusky salamander, Desmognathus fuscus. Major life history features are similar in all populations. Females lay eggs every year, with oviposition taking place in summer. Larvae transform at 9-12 mo of age. Males mature at 2 yr of age, females at 3 yr. Survival rates (determined from age structure and sex ratio) differ considerably among the populations, with these differences being greater for males and older animals than for females and juveniles, respectively. There is also substantial interlocality variation in body size and reproductive rate. Body size and adult survival are negatively correlated, but body size and juvenile survival are not statistically related. Reproductive rate is greater in populations where adult survival is lower. Part of these fecundity differences can be attributed to body size differences. Populations in the same physiographic province are the most similar, but not consistent geographic trends are present. Evidence is scant as to the cause(s) of the observed variation. The study suggests that a complte understanding of the magnitude and nature of broad geographic demographic trends may necessitate a consideration of local variation.

DeRosa C. T. and D. H. Taylor. (Miami University). A Comparative Study of Homeward Orienting Ability in Three Species of Turtles: Chrysemys picta, Terrapene c. carolina, and Trionyx spiniferus.

Homeward orientation of three species of turtles (C. picta, T. c. carolina and T. spiniferus) was determined following capture, displacement and release in a circular terrestial test arena. For all three species a significant orientation in the homeward direction was found. When these same animals were subjected to a phase delay of six hours, both C. picta and T. c. carolina shifted their direction of orientation 90° clockwise. This indicates the use of the sun or some other time dependent mechanism, in conjunction with an internal biological clock, for the purpose of homeward orientation.

Devine, Michael C. (University of Michigan). Species Discrimination in Mate Selection by Free-Living Male Garter Snakes and Experimental Evidence For the Role of Pheromones.

Individual male garter snakes of two species (Thamnophis sirtalis and T. butleri) were located in the field and presented with females of both species and experimentally treated females. Males invariably courted only conspecific females unless treatment was applied. Significant numbers of males of both species courted females of the alternative species which had been coated with a solution derived from females conspecific to the males involved. Evidently, species-specific chemical cues are important as releasers of male courtship and, consequently, they can have the effect of reproductive isolating mechanisms. The precision of discrimination by Thamnophis males compared to certain lizards is viewed as a function of differences in the mating systems of the two groups.

Dodd, C. Kenneth, Jr. (National Museum of Natural History) and Edmund D. Brodie, Jr. (Adelphi University). Antipredator Mechanisms of Neotropical Salamanders.

Antipredator mechanisms, including immobility, various postures, flipping, noxious secretions, tail autotomy, and cryptic and aposematic coloration, of 19 species of neotropical salamanders were studied during the summers of 1973 and 1975. Between 65% and 100% of individuals of each species became immobile when contacted in the field. Defensive postures generally fell into 8 categories: Body arched, body elevated, body coiled, limbs extended, limbs clasped, tail arched, tail elevated, and tail undulated. Flipping fell into 3 categories: coil-uncoil (Central American Chiropterotriton, Oedipina), running (Mexican Chiropterotriton, Bolitoglossa, Pseudoeurycea), and serpentine (only O. uniformis). Secretions were observed in most species and the secretions of P. smithi and B. resplendens proved noxious when tasted. Predator reaction to B. subpalmata and C. multidentatus confirmed that salamanders do posture and/or flip to escape predation. The importance and interrelationships of immobility, postures, noxiousness, and coloration will be discussed.

Douglass, John F. (University of South Florida). Patterns of mate-seeking and burrow use in a southern Florida population of Gopherus polyphemus.

Observations on courtship and combat were made during a long-term mark-and-release study of a population of Gopherus polyphemus at Archbold Biological Station in Highlands County, Florida. Dominant males maintained burrows of their own and visited as many as four different females at separate burrows during spring, summer, and fall. Courtship occurred at these burrows, where males head-bobbed into the entrances and awaited the emergence of female occupants. As many as three different males visited the same female in a single season, and males tended to vist the same female from year to year despite changes in the locations of preferred burrows. Defense of burrows by both males and females was observed, and fighting between males occurred over access to females and their burrows. Large males, by assertion of their dominance whenever other males were encountered, maintained spatiotemporal territories within which where were opportunities to breed with particular females. Patrolling and maintenance of harems by males was impeded by their slowness of movement relative to the dispersion of the females they visited, and subordinate males sometimes mated with preferred females in the absence of dominant males. (Research supported by Archbold Expeditions of The American Museum of Natural History).

Echternacht, Arthur C. (University of Tennessee). The Ameiva (Sauria, Teiidae) of Trans-Andean South America: Trends in Geographic Variation and a New Species.

Six species of Ameiva are known or expected to occur in trans-Andean South America: bridgesi, edracantha, festiva, leptophrys, orcesi and septemlineata. To these may be added an undescribed species from Colombia. With the exception of edracantha, all of these species show some degree of fragmentation (subdivision) of the dorsal scales of the head. The new species, bridgesi, septemlineata and orcesi essentially replace one another geographically as one moves from the wet lowlands of western Colombia to the dry valley of the Rio Jubones in southwestern Ecuador. The decreasing moisture gradient from north to south is paralleled by decreases in both the number of dorsal scales (as counted from occiput to rump or around midbody) and degree of fragmentation of the dorsal head scales. The adaptive significance of scale size is discussed.

Fawcett, James D. (University of Nebraska at Omaha). Effects of Simultaneous and Sequential Treatments With Estradiol and Progesterone on the Oviduct in Ovariectomized Anolis carolinensis).

Two weeks after ovariectomy adult lizards were injected daily with either saline, 10 ug estradiol-17B (E), 50 ug progesterone (P), or 10 ug + 50 ug P for 14 days. Two groups of lizards received either 10 ug E + (days 1 - 14) + 50 ug P (days 8 - 14) or 10 ug E (days 1 - 7) + 50 ug P (days 8 - 14). The lizards

were maintained on a 16:8D photoperiod at 31° C. In addition seven untreated ovariectomized lizards were used as initial controls. Results indicated that (1) all hormone treatments caused significant increases in oviduct-somatic indices (OSI), size of the uterine glands and width of the lamina propria, (2) increase in OSI's and uterine glands in those lizards treated with E + P was similar but significantly different from the E- or P-treated lizards, (3) maximal increase in height of the uterine epithelium was induced by the E + P treatment for 14 days, (4) administration of E alone induced maximal increase in width of the lamina propria. The E + P treatments induced histological changes which were comparable to the condition of the preovulatory uterus. These results suggest that estradiol may interact with progesterone in the control of oviductal maturation in the lizard.

Feaver, Paul E. (University of Michigan) A Population Study of the Northern Watersnake, Natrix sipedon, in Southeastern Michigan.

A population of the northern watersnake, Natrix sipedon, was studied from 1973 to 1976 at the E.S. George Reserve, Livingston Co., Michigan. Three hundred fifty individuals were marked and recaptured for a total of 1050 captures. Young are born in late August or early September. Females have one litter per season. Average clutch size is about 12 young per female and is positively correlated with female size. Both sexes mature at the age of 24 months and at this age males range in size from 370mm to 450mm svl (snout-vent length) and female range from 475 to 630 mm svl. Survivorship varies greatly from year to year in all age classes of both sexes. Life tables were constructed from the fecundity and survivorship data.

Fisk, Robert M. (University of Chicago). The Role of the Trunk in the Locomotion of Some Scincid Lizards.

Motion picture films were made of locomotion in a morphological series of skinks, ranging from fully-limbed forms (Leiolopisma reevesii), to those with highly reduced limbs (Chalcides chalcides). Preliminary analysis of these films suggests that: 1) Species with highly developed limbs (L. reevesii) hold their trunk off of the substrate and produce little axial curvature during gaits faster than a walk. Thus, the limb musculature produces most of the locomotor thrust. 2) Forms with moderately developed limbs (Chalcides ocellatus) apply the trunk to the substrate and develop large curvatures uniformly down the trunk during locomotion. The limbs are rotated posteriorly by this axial bending, producing forward thrust. Some locomotor force is also derived from limb retraction. 3) Skinks with the most reduced limbs (C. chalcides) exhibit a lateral undulatory locomotion typical of other limbless reptiles. 4) Some skinks in which the limbs are reduced, but with the hind limbs larged than the fore limbs (Chalcides mionecton and Chalcides sphenopsiformis), produce large axial curvatures

of greater amplitude posteriorly. This causes posterior rotation of the hind limbs with little aid from the hind limb musculature. The above are general patterns which may be affected by the speed at which a skink is moving and the substrate upon which it travels.

Forester, Don C. (Towson State University). Homing to the Nest by Female Desmognathus oschrophaeus, With Comments On the Sensory Modalities Essential in Clutch Recognition.

During the Summers of 1972 and 1973, Desmognathus ochrophaeus females were moved two meters from their nests in an attempt to simulate natural displacement. Seventy-eight of 107 females (73%) successfully relocated their nest within 24 hours. Behavioral studies conducted in the field and the laboratory confirm the ability of females to locate their eggs in the presence of other unattended clutches. Females occassionally select and brood the eggs of a conspecific in preference to their own. When this occurred, the preferred egg mass was always more advanced developmentally. Behavioral experiments point to olfaction as the sensory modality most essential to clutch recognition and discrimination. The effectiveness of olfactory cues apparently increases as a clutch develops. The adaptive significance of this phenomenon will be discussed.

Fouquette, M. J., Jr. and A. J. Delahoussaye (Arizona State University). Sperm Morphology in the Hyla rubra Group, and its Bearing on Generic Status.

Spermatozoa in the Hyla rubra group (sensu lato) differ from those of all other species currently placed in the genus Hyla by presence of two tail filaments rather than one. Three distinct sperm-head shapes occur in the group; a few species fail to fit precisely these categories. Comparison of sperm structure in Leptodactyloids prompts speculation of possible separate origins of certain Hyloid groups from Leptodactyloid stocks. Anuran sperm structure seems conservative, and differences parallel those used as criteria in current classifications; thus, sperm morphology is deemed a valid and useful tool for anuran taxonomy. Based on the diagnostic sperm-tail difference, plus prior definition of the Hyla rubra group, elevation of the group to generic status is judged valid and is advocated. Five species-groups within the genus are tentatively identified, based primarily on sperm-head shape. It is suggested that the two-filament anuran sperm-tail is primitive to the single one.

Franz, Richard. (University of Florida). Feeding Behavior in the snakes, Regina alleni and Regina rigida.

The snakes Regina alleni and Regina rigida feed on hard-shelled crayfish, particularly those in the genus Procambarus. Both snake species capture crayfish in "ratsnake" fashion, i.e. by

immobilizing with their body coils. Ingestion is abdomen first thus taking advantage of the natural folding of the crustacean's appendages. Similar feeding methodologies suggest a close phylogenetic relationship between Regina alleni and Regina rigida. Analysis of gut parasites also supports this arrangement.

Fritts, Thomas H. (San Diego Natural History Museum) Evolutionary Considerations of Sizes and Shapes in Giant Tortoises of the Genus Geochelone in the Galapagos Islands.

The individual populations of giant tortoises commonly grouped as Geochelone elephantopus exhibit considerable divergence within the Galapagos Archipeligo. Study of 26 morphometric characteristics of the carapace and plastron allow delineation of three major morphological trends. The relative position of individual populations on one of these trends is reflective of basic size and shape differences. Bivariate and multivariate statistics are useful in defining these differences. the principal morphological trends appear to correlate with altitudinal distributions of the taxa. Large tortoises are found on islands or volanic peaks of high elevations. Smaller tortoises tend to occur on islands of low relief. Some evidence exists linking size and body form to climate and plant communities at different elevations.

Garber, Steven (Cornell University). Biogeography and Distribution of Iguana and Cyclura in the Greater Anteilles.

The ecologically similar lizard genera Iguana and Cyclura are allopatric. Cyclura is declining throughout much of its range in the Greater Antilles; Iguana has become established in the eastern Greater Antilles. Reasons for both phenomena will be discussed.

Garcia-Lozano, L. Carlos, and J. Steve Godley. (University of South Florida). A Computer Approach to the Biogeography of the Herpetofauna of the Pacific Lowlands of Mexico.

The Pacific lowlands of Mexico form a transition between the Nearctic and Neotropical Regions. In the same way that vegetational formations correlate with climatic patterns we hypothesize that clusters of herpetofaunal species correspond with plant biomes. The testing of this hypothesis is accomplished by devising a data matrix with 105 species as individuals and their abundances as attributes in each of 28 (15 minute-wide) latitudinal belts. Three qualitative and 10 quantitative similarity indices are used to generate similarity matrices, ordination plots and dendrograms. These analyses are performed on each of 18 taxonomic and/or ecologic groupings including: Amphibia, Sauria, Serpentes, Reptilia (including Testudinata and Crocodilia), total herpetofauna (hf), terrestrial hf, arboreal/epiphyllous hf, fossorial hf, tropical-arboreal hf, southern affinity-arboreal hf, and northern affinity-terrestrial hf.

Gartside, Donald F. and Herbert C. Dessauer. (Louisiana State University Medical Center). Protein Evidence For a Narrow Zone of Hybridization Between the Chorus Frogs Pseudacris triseriata and P. nigrita.

Proteins representing 25 presumed loci were surveyed by electrophoresis in tissue samples of Pseudacris triseriata feriarum and P. nigrita nigrita from Louisiana and Mississippi. Different phenotypes of malate dehydrogenase and isocitrate dehydrogenase characterized allopatric populations of the two species, but where their ranges meet along the Pearl River intermediate (presumed heterozygous) phenotypes occurred. Complete transition from enzyme phenotypes characteristic of one species, to phenotypes characteristic of the other, occurred within 20 km and the transition area may be as narrow as 10 km. Different combinations of phenotypes of the two diagnostic enzymes were consistent with some individuals being F_1 hybrids, and others, later generation hybrids. Two other enzymes, phenylalanyl•proline peptidase and heart type lactate dehydrogenase, show large changes in presumed allelic frequencies across the hybrid zone, but presumed alleles are shared between the two species. Supported by N.S.F. grant BMS 73-01252.

Gillingham, James C. (University of Oklahoma). Reproductive Behavior of the Rat Snakes of Eastern North America, Genus Elaphe.

The courtship and mating behavior of the eastern North American rat snakes Elaphe obsoleta, E. guttata and E. vulpina were studied in captivity over a three year period. Thirteen motor patterns were defined and used in the construction of sequence chains with subsequent analysis. Tongue-flicks, caudo-cephalic waves, forwarded-jerking movements and other parameters were measured and compared at the specific level. Significant species differences were noted with respect to motor patterns and receptivity. The basic colubrid pattern was divided into the following three phases: tactile-chase, tactile-alignment, and intromission and coitus.

Godley, J. Steve (University of South Florida). Ontogenetic Shifts in Food Habits of a Crayfish Eating Specialist: Regina alleni (Serpentes: Colubridae).

The feeding ecology of Regina alleni was studied for 20 months in a south Florida water hyacinth community. Feeding and reproduction occur throughout the year with juveniles (200 mm TL) being present year-round. Libellulid odonate naiads account for over 96% of the prey items identified in juvenile R. alleni digestive tracts. Adult prey items identified in juvenile R. alleni feed primarily on hardshelled procambarid crayfish. Juveniles consume 6 times as many food items as adult, but adults eat proportionately larger prey. Prey orientation in R. alleni is species specific and dependent on prey morphology with crustaceans being injested caudally and odonate naiads head first. Laboratory observations indicate that juvenile R. alleni are

active, diurnal, visual predators and immobilize larger prey by weak constriction. It is suggested that these ontogenetic shifts in food habits are correlated with differential: (1) prey availability, (2) pursuit and capture success, and (3) potential caloric content of prey species, and that they represent the optimal foraging strategy for R. alleni.

Gong, Juliann D.-U., Elizabeth S.-F. Chao and James D. Fawcett. (University of Nebraska and University of Nebraska Medical Center) Histological Changes in the Thyroid of Ovariectomized Anolis carolinensis Following Estradiol and Testosterone Treatments.

In this study the effects of estradiol-17B (1 ug/day) and testosterone (5 ug/day or 50 ug/day alone, or in combination on the thyroid of ovariectomized adult lizards were examined. The lizards were maintained on a 16L:8D photoperiod at the preferred body temperature of 31° C. Preliminary results indicate that all hormone treatments induced increases in follicular epithelial cell height; however, these differences were not significantly different from those lizards treated with saline. Maximal increase in size of the follicular epithelium and ratio of epithelial height to follicular diameter was induced by the 1 ug estradiol plus 5 ug testosterone treatment. The mean diameter of the large colloid containing follicles of lizards receiving 1 ug estradiol plus 50 ug testosterone was less than that of all the other groups, but this difference was significant ($P < .05$) only when compared to lizards receiving saline. While these observations are open to several interpretations, it is suggested that they indicate that increased levels of steroid hormones may be responsible for changes in the thyroid of breeding lizards.

Greene, Harry W. (University of Tennessee). Coral Snake Mimicry: Does It Occur?

Indirect evidence supports the hypothesis that certain Neotropical colubrid snakes are Batesian mimics of venomous coral snakes. (i) From northern Mexico to Panama the presence, arrangement, and relative widths of red, yellow, and black rings in Pliocercus change concordantly with the color patterns of different sympatric Micrurus. The correlation extends to three unusual localized variants of the presumptive models and mimics. (ii) The defensive behavior of Leimadophis epinephalus consists of anterior body flattening; this exposes an interscalar pattern of red and black bands that resembles a sympatric Micrurus. The color pattern is thus not cryptic becuase it appears only during the defensive display and makes the immobile snake more easily seen. Leimadophis epinephalus apparently does not bite, so the color pattern and behavior probably do not serve as a true aposematic display.

Haas, James D. (Tufts University). Individual Differences in the Vocalizations of the Bullfrog, Rana catesbeiana.

Individual differences in the mating calls of male Bullfrogs, Rana catesbeiana, were studied during the 1974-1975 breeding seasons at Pickman Pond, Bedford, MA. Fifty calls from each of 20 individually marked males were analyzed in terms of temporal and frequency parameters. The pulse rate (pulses/sec), the percent croak time ((sum of the total duration of each croak/total duration of the call) X 100, the utilization of the harmonically related frequency bands within each croak, and the frequency modulation patterns of these bands were characteristic of an individual. The variance among individuals was 2-3 times the variance within individuals (analysis of variance; $p < 0.05$ in all cases). The behavior of individual Males in response to a call depended upon the individual calling. Established neighbors evoked more calling and mild aggression (only an approach). Strangers (individuals from a distant shore or never previously observed in the area) evoked chasing and bouts of wrestling. Preliminary playback experiments, using calls recorded from a known neighbor and distant individuals (the same pond and a pond 25 miles away) yielded similar results. The call individuality and the behavioral data are discussed in terms of individual recognition and the social system of the Bullfrog.

Hall, Stephen P. (University of North Carolina, Chapel Hill). Path Characteristics in a Population of Eastern Box Turtles.

Box turtle movements are non-random in at least two respects: (1) there is a long-term tendency for turtles to remain within a relatively circumscribed area; (2) there is an orderly pattern in short-term changes in the direction of travel within day-ranges. I used the Breder-Stickel method to trail turtles and have examined the distributions of angles turned between successive trail segments through a Markov-chain analysis. The results are related to various environmental parameters - weather, vegetation, and topography - and to location on the home range.

Hendricks, Fred S. (Texas A&M University). Systematics and Evolution of Cnemidophorus tigris east of the Continental Divide.

Geographic variation in scalation and patterns of Cnemidophorus tigris east of the Continental Divide is presented. The population of C. tigris examined segregate into five recognizable units representing three chronologically disparate levels of divergence coinciding with the expansions and contractions of the Chihuahuan Desert. The marmoratus subspecies cluster and variolosus cluster represent the earliest divergence; pulcher represents an isolated and stabilized intergrade population formed from marmoratus and variolosus. The most recent divergence has occurred within the marmoratus and the variolosus clusters.

Heyer, W. Ronald (Smithsonian Institution). Studies in Larval Amphibian Habitat Partitioning.

The author is required to have an abstract so that he may orally present the paper rather than have it a title only paper. The author will doubtless talk on the titled subject. He is likely to present some data and get carried away in its interpretation.

Howard, Richard D. (University of Michigan). Mating strategies in Rana catesbeiana.

Mating behavior of bullfrogs, Rana catesbeiana, was observed during the summers of 1974-1976 at the E. S. George Reserve in Livingston Co. in SE Michigan. Mating success of males was determined by following marked individuals. Data on factors influencing mate selection by females and subsequent variation in male mating success were also obtained. The population has been toe-clipped for the past 6 years, providing valuable information on the influence of age on mating strategies.

Jayne, Bruce C. and Harold K. Voris. (Field Museum, Chicago). A Preliminary Look at the Evolution of Form and Function in the Costocutaneous Muscle System in Marine Snakes.

Data on the size, origin and insertion of the superior and inferior costocutaneous (CC) muscles are presented for 11 terrestrial, 2 amphibious and 11 completely aquatic species of snakes. The aquatic species exhibited more dorsal insertions than did the terrestrial species, for either or both the superior and inferior CC muscles. Most of the more dorsally inserted inferior CC muscles had origins proximal to the cartilaginous tip of the rib. Some of the fully aquatic forms also showed a reduction in the size of the inferior CC muscles. This variation in the CC musculature was accompanied by an increase in the number of ventral scutes in fully aquatic species and a consequent departure from hte 1:1:1:1 ratio of vertebrae, ribs, CC muscles and ventral scutes exhibited by terrestrial snakes. Although there are differences in degree and detail, all forms of terrestrial snake locomotion involve the vertebrae, ribs, CC muscles and ventral scutes. Observations indicate that the CC muscles function in the lateral undulation of marine snakes by maintaining an oval body form.

Jeffries, William B. and Harold K. Voris. (Dickinson College and Field Museum). The Identification of Pedunculate Barnalces Found on Malaysian Sea Snakes with Notes on Their Mode and Site of Attachment.

More than 1000 marine snakes from the Straits of Malacca (Malaysia) representing 13 species and 7 genera were surveyed for epifaunal organisms. The "goose barnacle", Dichelaspis

pellucida Darwin (Cirripedia) was found on 9 species of snakes, representing 5 genera. Three of the snake species examined were represented by relatively large samples. Twenty-five percent of 345 Lapemis hardwickii examined were infested, 13% of 326 Enhydrina schistosa, and 27% of 128 Hydrophis fasciatus. Some goose barnacles were found attached to every region of the external surface of the snakes although they appeared in greatest abundance on the posterior half of the body. The mode of attachment of these barnacles to the surface of the snake skin has been examined using scanning electron microscopy. These studies plus field observations on the fate of the barnacles during the snakes' shedding, allow us to begin to understand the dynamic nature of this symbiotic relationship.

Juterbock, J. Eric (Ohio State University). Significance of Morphological Variation in Three Species of Desmognathus (Caudata: Plethodontidae).

Information concerning inter- and intraspecific relationships of selected characteristics to size was obtained during a study of the taxonomic status of Desmognathus welteri and a comparison with D. fuscus and D. monticola. Many of these relationships have not been previously studied, while studies of others have yielded confusing or conflicting results. The number of costal folds between adpressed limbs is similar in recently transformed individuals of both sexes and becomes greater for females at increasing sizes (SVL) in D. fuscus and D. welteri; no significant difference exists for D. monticola. The number of costal folds between adpressed limbs increases in the sequence monticola - welteri - fuscus at almost any body size. The numbers of upper jaw teeth increase with size in both sexes and adult females have more of these teeth than adult males in all three species. The numbers of vomerine teeth remain essentially the same in females and decrease in males with increasing size. Males lose a few dentary teeth with increasing size, females gain these teeth with increasing size. For all three types of teeth, numbers of teeth tend to increase in the sequence fuscus - welteri - monticola for any given size or sex. Some possible explanations of, or mechanisms for, these differences are discussed.

Karlin, Alvin A., Sheldon I. Guttman, David M. Dennis, and George M. Labanick. (Miami University). A Biochemical and Morphological Analysis of the Relationship of Plethodon longicrus and P. yonahlossee.

Plethodon yonahlossee Dunn, 1920 and Plethodon longicrus Adler and Dennis, 1962 were collected from their type localities and three intermediate localities during the spring and summer of 1975. The taxonomic status of Plethodon longicrus was re-evaluated based on morphological analysis of color pattern and costal folds, and electrophoretic analsyis of 21 enzymatic and non-enzymatic loci.

Keen, W. Hubert. (Kent State University). Effects of Temperature and Moisture on the Foraging of Desmognathus ochrophaeus.

The effects of temperature and moisture on the foraging success of Desmognathus ochrophaeus were studied during one annual cycle of the surface activity in northeastern Ohio. Foraging success was independent of temperature above a certain minimum level, and thus during most of the annual activity period. Length of the seasonal activity period was defined by minimum temperature, with activity diminishing and ceasing when temperatures were in or below the 0°-5°C range. Foraging success was directly correlated with habitat moisture over a wide range of moisture levels, resulting in poor feeding success for salamanders in habitats of marginal quality. Other studies suggest that absolute abundance of prey and interspecific interactions are not critical factors determining predation success of D. ochrophaeus at the study site. The suitability of habitat with respect to moisture, and length of the seasonal period when temperatures exceed some minimum level, thus appear to determine the overall foraging success.

Krouse, John R., Frank J. Evans and James D. Fawcett. (University of Nebraska at Omaha). Testicular Responses to Different Doses of Melatonin in the Lizard Anolis carolinensis.

During the second week of December, 32 large (mean body weight, 5.67 g) Anolis carolinensis were randomly separated into four treatment groups: saline control, 2 µg melatonin (M), 10 µg M or 50 ug M. In addition six lizards were killed as initial controls. Injections of 0.05 ml were given subcutaneously in the neck region for 14 days. The lizards were kept on a 16L:8D photoperiod at 31° C. The mean gonadosomatic indices (GSI) of the treated lizards were not significantly different from each other, and all had larger GSI's than did the initial controls. However, the GSI of lizards receiving 2 µg M was not significantly different from the initial controls. Histological analysis showed that the 10 µg M and 50 µg M treatments caused a significant increase in diameter of the seminiferous tubules. The 50 µg M treatment produced maximal growth of the seminiferous tubule epithelium and all stages of spermatogenesis. Conversely, growth of the seminiferous epithelium in the 2 µg M-treated lizards was significantly inhibited, the lumina of the tubules were filled with debris and spermatozoa were sparse. These results suggest that dosage determines whether melatonin will stimulate or inhibit testis maturation in A. carolinensis.

Krzysik, Anthony J. (University of Pittsburgh). Comparative Demographic Ecology of Desmognathus in Western Pennsylvania.

No Abstract Received.

Lotter, Fred and Norman J. Scott, Jr. (University of New Mexico). Studies on the Polymorphic Salamander Plethodon cinereus in New England: Ecological Differentiation of the Morphs and Reproductive Ecology. *PAPER WITHDRAWN.

Studies of geographic and temporal variation in morph frequencies in New England (exclusive of Maine) show that the black morph is less adapted to cold climates than the red or striped morphs. In a dimorphic population of 30% black and 70% striped individuals the black frequency was significantly higher among juveniles than adults, indicating actual differential mortality. Young adult females apparently deposit eggs every other year, while older ones lay every year. There is a positive correlation between female size and the number of mature ovarian eggs possessed. Female blacks reach reproductive maturity at a larger size than striped females.

Lynch, John D. (University of Nebraska-Lincoln). The Systematic Significance of Variation of the Coccyx in Some South American Leptodactylid Frogs

The anterior end of the coccyx in Batrachophrynus brachydactylus, B. macrostomus, and Telmatobufo venustus exhibits vertebral form. The sacrococcygeal articulation is bicondylar in all three species and none has prezygapophyses on the coccyx; all three species have transverse processes and large spinal nerve foramina on the coccyx. These features are consistent with the idea that deletion of a vertebra through the sacrum has occurred. If that is so, the ancestors of Batrachophrynus and Telmatobufo should exhibit nine presacral vertebrae, a character-state heretofore associated only with the archaic frog family Leiopelmatidae.

Malaret, Luis. (University of Kansas). A Field Study of the Northern Prairie Lizard, Sceloporus undulatus garmani.

During the summer of 1974 northern prairie lizard, Sceloporus undulatus garmani, were studied in the northern edge of the sandhills in Bennett Co., South Dakota. The lizards were closely associated with the yucca plant (Yucca glauca) which was used as basking sites, protective and nocturnal retreats. A bimodal pattern of activity was apparent; the lizards were most active between 0900 and 1200 and then activity decreased, increasing at 1700. The density was 4.2 individuals per hectare. This species was the most commonly observed reptile in the study area. Hatchlings were first observed on July 22. The ecological significance of these data will be discussed.

Maple, William T. (Bard College, Annandale-on-Hudson, NY). Competition Avoidance Mechanisms in Three Species of Desmognathus.

Population structure, life history parameters, and larvae were studied in five populations of D. quadramaculatus, D. fuscus, and D. monticola in Ohio, West Virginia and North Carolina in

an attempt to determine the strategies which promote coexistence between ostensibly competing congeners. Where fuscus is sympatric with monticola in W. Virginia it has a lower reproductive effort than the allopatric Ohio population, suggesting a more K-selected strategy where congerers interact. These sympatric fuscus also have longer larval periods than allopatric Ohio fuscus (24 mo vs 11 mo). In N. Carolina, the larval period of monticola is the same as in W. Virginia (13 mo), however sympatric quadramaculatus, has a 24 mo larval period. In addition, the larvae of the larger of two sympatric congeners (W. Virginia fuscus and N. Carolina quadramaculatus) tend to grow and absorb their yolk faster, and have a greater allometric head growth than the smaller monticola. These differences between larvae could act to reduce competition by promoting habitat separation and by exaggerating size differences permitting the young to exploit different-sized prey.

Marangio, Michael S. (Louisiana State University, Baton Rouge). The occurrence of neotenic rough-skinned newts (Taricha granulosa) in montane lakes of southern Oregon.

Populations of neotenic rough-skinned newts were found in 7 lakes and ponds at elevations from 5720-6060 feet above sea level in the southern Cascade Mountains of Oregon. In localities where large numbers were observed, the proportion of salamanders retaining gills or gill stubs ranged from approximately 85-100 percent. Terrestrial conditions in the study area are harsh, due to long, cold winters and dry summer seasons. By remaining in the more stable aquatic environment, salamanders can better survive the drastic climatic changes. Taricha granulosa in the study area are probably facultative in their ability to metamorphose, since they are found with varying gill lengths, and gills are resorbed in the laboratory with and without exposure to thyroxine.

Mautz, William J. (Cornell University). Resource Partitioning by Lizards in a Cave Habitat.

Lepidophyma flavimaculatum (Xantusiidae) and Phyllodactylus lanei (Gekkonidae) occupy a system of caves formed by piles of granitic boulders at Puerto Marquez, Guerrero, Mexico. Both species are found on rock walls and in recesses inside the caves by night and day. While P. lanei frequently emerge onto the surface at night, L. flavimaculatum do so very rarely. Individual L. flavimaculatum occupy specific perch sites within caves and forage inside both by night and day. P. lanei feed on small arthropods, while L. flavimaculatum feed almost exclusively on the fruit of fig trees (Ficus spp.) which falls among the boulders and becomes available to the lizards inside.

Maxson, Linda (University of Illinois, Urbana). Convergent Evolution in the Hylid Frog Anotheca.

Protein evolution is primarily a divergent process, proceeding independently of organismal or morphological evolution (Wilson et al., PNAS, vol. 71, 1974). This makes proteins ideal tools for detecting cases of convergent anatomical evolution. A probable instance of convergent evolution, involving the monotypic genus Anotheca, was detected by comparative studies of serum albumin. On the one hand, Anotheca albumin is shown to be as similar to the albumins of several North American Hyla as the albumins of the North American Hyla are to one another. On the other hand, Anotheca albumin is very different from the albumins of the marsupial tree frogs, as different as are those of Hyla. Phylogenetic analysis of the albumin data indicates that Anotheca is phyletically a member of the subfamily Hylinae. Thus, its placement in the Amphignathodontinae was due to convergent morphological evolution in Anotheca to resemble the other genera of marsupial tree frogs.

Mc Coid, Michael J. (San Diego Natural History Museum). Preliminary Remarks on Introduced Populations of Clawed Frogs (Xenopus laevis) in Southern California.

Aspects of the biology of selected populations of X. laevis have been studied in southern California since 1974. Population densities, growth rates, and reproduction are estimated for populations in San Diego and Riverside Counties. Analyses revealed different densities and differential growth rates between adjacent populations. Reproductive characteristics of these populations are described. Frogs were found to breed as early as November and as late as June.

McDiarmid, Roy W. (University of South Florida) and John W. Wright (Natural History Museum, L.A. Co.). Chromosomes and the Relationship of the Scincid Lizard Neoseps reynoldsi Stejneger.

The meager chromosomal data available for the scincid lizard are sufficient to indicate a high level of chromosomal conservatism in the family. Using this apparent conservatism as a basis for a phylogenetic hypothesis, we examined the karyotypes of Neoseps reynolsi and 19 species of Eumeces, the group from which N. reynoldsi is thought to have been derived. These 19 species are representative of 11 of the 15 species groups of Eumeces as proposed by Taylor. N. reynoldsi and all but one species of Eumeces share essentially the same karyotype: 2N = 26 with six pairs of biarmed macrochromosomes and seven pairs of uni- and biarmed microchromosomes. The unique karyotype is that of E. schniederi. This karyotype consists of 2N = 32 with no macro-micro dichotomy, and is apparently identical to the karyotype of Scincus officinalis, a representative of a group thought to be closely related to the relatively primitive E. schniederi. Evolutionary and zoogeographic implications of these findings are discussed.

Means, Bruce. (Tall Timbers Research Station). Geographic Body Size Variation, Life History, and Growth Among Populations of a Streamside Salamander (Desmognathus brimleyorum) on Adjacent Mountains.

No Abstract Received.

Miller, Paul.
A Demographic Study of the Chorus Frog, Pseudacris triseriata.

Chorus frogs, Pseudacris triseriata, were studied in a piedmont environment (elevation=1450 meters) near fort Collins, Colorado, in the summer of 1975. The population studied was found to differ from proximate montane (70 Km away, elevation=2900m) populations of chorus frogs in the following ways: piedmont adults disappeared after the breeding season, piedmont frogs reached sexual maturity in one summer and piedmont frogs were more nocturnal and crepuscular than the more diurnal montane frogs. Individual growth rates of piedmont juvenile frogs were similar to growth rates reported for montane juvenile frogs. These differences are reflection of the different demographic strategies of this species in two environmental situations.

Mitchell, Joseph C. and M. J. Fouquette, Jr. (Arizona State University). A Gynandromorphic Cnemidophorus inornatus (Sauria: Teidae).

A morphological and histological description of a gynandromorphic Whiptail lizard is presented. The specimen appears typical of Cnemidophorus inornatus arizonae and seems to be a functional male. There are paired hemipenes; there is a testis and male ducts on the left, but an ovary with yolked follicles on the right. The possibility is discussed that the individual resulted from hybridization of a male C. inornatus X female C. uniparens (a sympatric, thelytocous species).

Novotny, Elizabeth Sherman. (University of Vermont). Effects of Thermal and Water Stress on Heart Rate in Bufo americanus and Bufo marinus.

Heart rates were measured in Bufo americanus and B. marinus as the toads were heated from 10°C to 30°C under different humidity conditions. Toads heated in an environment in which much water is lost from the skin (low humidity) exhibit higher heart rates than toads heated in a situation in which less water is lost (high humidity or oil-coated skin). This is especially noticeable at higher body temperatures. These results suggest that the elevated heart rates in the low humidity (high water loss) environment facilitate the replacement of water in the skin by the more rapid circulation of the blood.

Nowak, Robert T. and Edmund D. Brodie, Jr. (Adelphi University). Rib Penetration as an Antipredator Mechanism in Pleurodeles waltl.

The skin of salamanders contains granular glands which, in some species, produce a secretion which repels predators. The ribs of Pleurodeles waltl (family Salamandridae) penetrate the epidermis of the lateral body wall in a localized aglandular region surrounded by granular glands. The ribs of P. waltl are longer than those of other salamandrids of similar size (Taricha granulosa, Paramesotriton hongkongensis, Salamandra salamandra). Each rib, distal to its myoseptum, is surrounded by a loose sheath of connective tissue. Costal musculature inserts onto the anterior surface of each rib proximal to the myoseptum and other muscle fibers insert onto the connective tissue sheath. The tip of the rib lies just beneath the inner surface of the skin and is drawn forward penetrating the skin when certain antipredator postures are assumed. The tip of the rib would presumably transmit the secretions from the skin of salamander to a would-be predator causing increased pain if the rib tip lacerates the predator.

Obert, Hans-Joachim (University of Bonn, Germany). Hormonal Influences on Calling and Reproductive Behavior in Anura.

In mid-European anura two distinct forms of reproductive and calling behavior are apparent. In the "linear type" only a single self contained calling and reproductive period occurs. The development of the endocrine organs during the reproductive period are of linear pattern. The interstitial tissue in the testes exhibits a gradual recession in the activity of the androgen-producing cells. Members of the Ranidae and Bufonidae families belong to this type. In the second, the "oscillatory type", several separate calling and reproductive periods occur. They are interrupted by pauses in which no mating calls and deposition of eggs can be observed. The members of the Discoglossidae family belong to this type. In these toads the development of the endocrine organs shows oscillatory decrease and increase. Within the calling periods the toads are highly stimulated via androgenic hormones. The 3B-steroiddehydrogenase is highly active in the interstitial tissue. Within the pauses however the interstitial cells are less active. The activity of the 3B-steroiddehydrogenase is low. One of the most important adrogenic hormones, controlling calling behavior, is the testosterol because it induces atypical mating calls. It is suggested that other androgenic hormones, together with testosterol, control calling and mating behavior in anura.

Packard, Mary J. and Gary C. Packard. (Colorado State University). The Influence of Melatonin on Reproductive State in Male Callisaurus Draconoides.

Male Callisaurus draconoides were injected with 5 µg melatonin per day for 20 days; and matched control animals were given daily injections of the saline vehicle. Testes subsequently were prepared for histologic examination, and were classified as being near peak activity or as being in a state of regression. Testes from animals injected with saline were at peak activity, whereas those from lizards receiving exogenous melatonin were undergoing regression. Thus, melatonin, the putative hormone of the pineal gland, has an antigonadal effect similar to that reported for other vertebrates.

Pefaur, Jaime E. (Nuseum of Natural History, The University of Kansas). Ecological Study of Tropidurus peruvianus in Southern Peru.

Tropidurus peruvianus is an inhabitant of areas characterized by xeric vegetation. In Arequipa, Peru, it is distributed from the coast to the tolar mesothermal belt at an elevation of 2800 m, but does not occur in the extensive sandy desert plateaus. A 12 month- study of a population in the "Lomas" formation of the southern Peruvian coast, showed that T. peruvianus inhabits only the temporarily short-grass lower belts. Occasionally it extends upward in narrow tongues of xeric vegetation to the top of the "Lomas" at 1000 m, avoiding the more densily vegetated ravines where wetter conditions prevail throughout the year. A higher proportion of individuals were caught during the dry season.

Perrill, Stephan A. (Butler University). Color Preference in Eumeces inexpectatus.

In a laboratory test, lizards were given the choices of red, blue and neutral. Juveniles and adults showed a convincing preference for red. The preference for red shown by adults possibly facilitates sexual identification during the mating season when the male's head is red-orange. The lack of response to blue may indicate an avoidance of blue. The avoidance could reinforce tail-wag, a submissive posture displayed predominantly by blue-tailed juveniles and hatchlings. Similarly the juvenile response may be an avoidance of blue facilitating dispersal, or a response established in early development but not functional until sexual maturity.

Phillips, John B. (Swarthmore College). Possible Use of Weak Magnetic Fields by Orienting Salamanders.

Twenty-nine Cave Salamanders (Eurycea lucifuga) were collected in Giles Co., Va. and Greenbrier Co., W. Va. in August 1975 and placed in one of two training situations in which their principle direction of movement is either parallel to the true N-S axis (of approximately the same magnitude and vertical component but shifted clockwise 90° in the horizontal plane). Both groups are housed in light-proof corridors which have compartments containing limestone at either end. Movement

through the corridors is encouraged by shifting a water supply from one end to the other at two day intervals. Both corridors are aligned along the true N-S axis, but one is contained in a coil which produced the altered field in which the N-S axis is perpendicular to the corridor. For testing all 29 animals are released in the center of a cross-shaped testing apparatus (a combination of the two training corridors) which is aligned to coincide with the cardinal compass directions. Tests are carried out in both the normal and altered fields in order to shift the magnetic expected directions relative to other possible cues. In a number of the tests, representing each control situation, the two groups segregated significantly ($P < .05$) along the axes corresponding to the trained directions relative to the magnetic field.

Phillips, William L. and Robert H. Mount.
Relationships Within the Genus Acris (Anura: Hylidae) in Alabama.

The relationships among Alabama populations of cricket frogs were studied from 1973-76. Characters separating Acris crepitans from Acris gryllus were established after examining individuals from allopatric populations and used to determine the nature of the apparent intermediacy in sympatric populations. Introgression is apparently occurring in the Fall Line Hills physiographic province. Examination of collections made from one sympatric population over a 29-year period indicate that characteristics usually associated with A. crepitans are apparently more adaptive in the area inhabited.

Plummer, Michael V. (Harding College). Reproduction and Growth in the Turtle, Trionxy muticus.

Male Trionxy muticus mature in their fourth year at a plastron length of 80 mm and females mature in their ninth year at 140 mm. Clutch size averaging about 11 eggs, and number of clutches, are related to body size. Hatchlings have a mean plastral length of 24.5 mm and double in length by the end of their first year. Young males grow about 2 mm per month; females grow 2-3 mm per month. Growth rate decreases with maturity. Growth is individually variable and changes seasonally and yearly.

Pough, F. Harvey, Gary Kwiecinski, and Willy Bemis. (Cornell University). Melanin Deposits Associated With the Venom Glands of Snakes.

Melanin in the skin and superficial muscle and connective tissue in the heads of crotaline snakes (more than 25 species in the genera Agkistrodon, Bothrops, Crotalus, Lachesis, Sistrurus, and Trimeresurus) is locatlized over the brain and venom glands. Melanin was found in 5 sites associated with the venom glands. There is some reciprocity in distribution of melanin between the sites, and two high altitude rattlesnakes had denser melanin deposits than the other species examined. Colubrid snakes have

no comparable melanin deposits except for two opisthoglyph genera, Leptophis and Oxybelis, which have dense melanin deposits covering the superior labial glands (Duvernoy's Glands). Melanin in all these snakes is found in dorsal and dorsalateral aspects where it would intercept solar radiation before it reached the venom gland. This shield of melanin may reduce photodetoxification of venom in the gland by ultraviolet and visible light.

Pough, F. Harvey, Margaret M. Stewart, and Richard G. Thomas (Cornell University, SUNY Albany, Cornell University). Physiological Basis of Habitat Partitioning in Jamaican Eleutherodactylus.

Physiological characteristics of 4 species of Eleutherodactylus from Jamaica correlated well with differences in microhabitat distribution. Eleutherodactylus cundalli and E. gossei are endemic to Jamaica while E. planirostris and E. johnstonei are introduced. The native species are more abundant in cool, moist microhabitats while the introduced species are more common in warmer, drier areas. Frogs were acclimated to 20°C and a 14:10 L:D photoperiod to test several physiological characteristics. The introduced species tolerate greater heat and dryness than the native species.

	Native Species	Introduced Species
$\bar{X}$ Selected Temp. (°C)	22.1 - 22.9	25.7 - 27.3
CTM (°C)	36.0 - 36.0	38.7 - 39.2
Crit. Water Loss (%)	23.9 - 26.8	34.9 - 41.3
Evap. Rate (mg/cm^2 hr)	24.7 - 29.6	24.7 - 27.6

These physiological diffferences provide a basis for observed differences in distribution and activity.

Ralin, Dennis B. (Kentucky State University, Frankfort). Behavioral and Genetic Differentiation in a Diploid-Tetraploid Cryptic Species Complex of Treefrogs.

Two mating call parameters and 2 protein loci in diploid (Hyla chrysoscelis) and tetraploid (H. versicolor) populations are analyzed in a transect from central Texas to the Atlantic Coast. Four groups of populations can be distinguished in the complex. Eastern diploid populations have fast pulse rates, long calls, are fixed for the Ldb-100 allele, and have high frequencies of the Mdhl-83 allele. Western diploid populations have very fast pulse rates, short calls, are fixed for the Ldb-13 allele and have lower frequencies of the Mdhl-83 allele. Southern tetraploid populations have slow pulse rates, intermediate length calls, approximately equal Ldb-100/Ldb-13 frequencies, and intermediate Mdhl-83 frequencies. Northern tetraploid populations have very slow pulse rates, intermediate length calls, very high Ldb-100 frequencies, and high frequencies of Mdhl-83. Initial mating call differentiation in H. chrysoscelis was probably slight prior to giving rise to the tetraploid in the southwestern part of the range. Differentiation of the Eastern and Western diploids probably came about as a result of character displacement between sympatric Western diploid and Southern tetraploid populations. Subsequent occupation of similar geographic areas

has resulted in parallel gene frequencies and mating calls in allopatric diploid and tetraploid populations.

Pregill, Gregory K. (University of Kansas). Morphology of the neck region in Coluber constrictor (Serpentes: Colubridae).

Dissection of the axial musculature of numerous individuals of the racer Coluber constrictor has demonstrated that cranial mobility is effected most by several muscles confined to the neck region. Otherwise, the skeletal and muscular composition of the neck region is nearly identical to that of the trunk. This neck-trunk uniformity is necessary to insure smooth, synchronous flexion during locomotion, but apparently the arrangement has obscured the history of the neck region in colubrine snakes. The cervical muscles probably have been retained from a lizard ancestry, but homologies are uncertain. Work is now in progress to trace the morphological history of the ophidian neck region. Hopefully the results will be useful in understanding the evolution and functional significance of cranial mobility in snakes and other limbless vertebrates.

Sever, David M. (Saint Mary's College). Identity of an Enigmatic Eurycea (Urodela: Plethodontidae) from the Great Smoky Mountains of Tennessee.

Willis King reported in 1939 the presence at altitudes below 933 m in the Great Smoky Mountains of Tennessee an enigmatic Eurycea distinct from sympatric E. bislineata but clearly showing affinities with that species. After recent discovery of King's specimens, they were compared to the type series of E. junaluska from Graham County, North Carolina, and no differences were found in seven morphological characters. King's specimens are thus referred to E. junaluska, extending the known range of this species northwestward into three more major drainages of the Tennessee River. When compared to three samples of Smoky E. bislineata, King's E. junaluska differed from all samples in pigmentation, mean number of prevomerine teeth, and mean tail percent of total length. There was considerable variation among the samples of E. bislineata in other characters, some of this variation perhaps relating to altitudinal differences among localities for the samples. Some preliminary data indicate that Smoky Mountain E. junaluska may have a different breeding season than sympatric E. bislineata.

Thornton, Okla W. and Robert A. Thomas (Texas A&M University). The Status of the Houston Toad, Bufo houstonensis.

The Houston Toad, Bufo houstonensis, is probably on the verge of extinction. A concerted effort in the spring of 1975 to locate and define extinct populations revealed only two existing

in Bastrop and Burleson Counties, Texas. The toad has not been observed at any of the other previously known localities since 1967. Endangered status is probably due to habitat manipulation and hybridization. During the spring, 1976, a study was conducted to correlate environmental parameters with the toad's breeding activity. Data reveal that a number of factors appear to be involved in stimulating activity.

Tomson, Libby H. (Mississippi State University). Sun-Compass Orientation in Four Species of Ambystoma.

No Abstract Received.

Trauth, Stanley E. (Auburn University). Seasonal Ovarian Histology of the Eastern Collared Lizard, Crotaphytus collaris collaris (Say), from Arkansas.

The paucity of literature pertaining to lizard ovarian morphology led to this study of the histology of ovarian structures. Lizards were collected during the activity seasons of 1971-1972. Degenerating corpora lutea remain in the ovary as corpora albicantia and persist throughout the life of the lizard. Two types of follicular atresia are found to exist; both types in the regressed condition macroscopically resemble corpora albicantis. This indicates that macroscopic counts of corpora albicantia to estimate reproductive potential should be rejected and microscopic analyzes be adopted.

Van Devender, Robert Wayne (University of Michigan). Comparative Demography of Basiliscus basiliscus.

Two local populations, 2.5 airline km apart, of Basiliscus basiliscus were studied between 1971 and 1975 to determine if demography varied microgeographically. Size and age at maturity (130-135 mm SVL and 16-20 months, respectively) were identical at both sites; but females at one site produced two extra clutches per year (7 vs. 5) despite similar reproductive seasons. Females at the former site also produced larger clutches at most sizes (egg no. = -18 + 0.177SVL vs. egg no. = -12.7 + 0.137SVL, respectively). Significant annual and site differences were also seen in juvenile female and egg survivorship, respectively. All results are consistant with the hypothesis that these lizards react to local differences in the predictability of egg mortality by altering energy expenditure for reproduction.

Veloso, Alberto and Patricia Iturra. (Universidad de Chile). Chromosome Evidence for Different Phyletic Lines in the Frog Genus Eupsophus (Amphibia: Leptodactylidae).

The species presently included in Eupsophus can be separated into two groups on the basis of morphology and karyology. E. roseus

(2n=30) and E. vertebralis (2n=28) are included in the roseus group and have high chromosome number and the presence of telocentric chromosomes. E. monticola (2n=26), E. nodosus (2n=22) and a new species E. tumultuosus (2n=26) comprise the nodosus group with only submetacentric and metacentric chromosomes. In the nodosus group an intercalary secondary constriction in chromosome and morphology, we consider the roseus and nodosus group to be generically distinct. The name Alsodes (Bell 1843) is available for the nodosus group.

Voris, Harold K. and Helen H. Voris. (Field Museum, Chicago). The Natural Food and Feeding Behavior of a Marine Snake, Enhydrina schistosa (Hydrophiidae).

The stomach contents of 364 adult and 516 juvenile Enhydrina schistosa collected from the Straits of Malacca over a 10 month period have been analyzed. The principal food of both adults and young are catfish of the family Tachysuridae. The diet of adults is slightly more generalized than that of the young. Twenty-five juvenile E. schistosa between the ages of one and six weeks were observed feeding a total of 42 times in the laboratory. Feeding behavior followed a constant pattern which included seven discernible components: Search, Recognition, Strike, Hold, Pre-ingestion positioning, Ingestion, and Post-ingestion. There is some evidence that several of these feeding stages include behaviors which are specializations to feeding on prey which have large, barbed, poisonous pectoral and dorsal spines, and to feeding in flowing water.

Wake, David B. and Ronald W. Marlow. (University of California). A New Species of Plethodontid Salamander From the California Desert.

An undescribed species of Batrachoseps has recently been discovered in the Inyo Mountains of California. This desert mountain system has previously been thought to provide inhospitable habitats for plethodontid salamanders. The new species, found in several canyons, is the most generalized member of the genus, and seems to represent a very early derivative of the Batrachoseps lineage. Relationships within Batrachoseps are discussed. In osteology the new species is closer to the postulated common ancestor of the tribe Bolitoglossini (including Batrachoseps, Hydromantes, and the neotropical genera) than is any other living species.

Wake, Marvalee H. and Susan M. Case. (University of California). The Immunological Comparisons of Caecilian Albumins.

Analysis of relationships of six genera of caecilians (Amphibia: Gymnophiona: Ichthyophis, Dermophis, Gymnopis, Caecilia, Geotrypetes, Boulengerula) by microcomplement fixation gave immunological distances of from 70 units to 210 units for Dermophis sera to sera of the other genera. Times of divergence indicated

for these genera are consistent with those postulated on zoogeographical grounds. Gymnopis and Dermophis appear to have diverged from each other in the Oligocene, Dermophis from the Caecilia stock in the early Eocene, adn the Dermophis stock from the African and the southewat Asian stocks in the early and mid-Cretaceous.

Wassersug, Richard J. and Stevan J. Arnold (University of Chicago). Differential Predation on Tadpoles, Metamorphosing Individuals and Frogs by Garter Snakes (genus Thamnophis).

Garter snakes are common predators on frogs and tadpoles. Stomach contents of wild-caught garter snakes, Thamnophis sirtalis and Thamnophis elegans, show a preponderance of anuran prey at the peak of metamorphic transformation. Laboratory experiments using Thamnophis sirtalis as a predator and the chorus frog Pseudacris triseriata as a prey show that T. sirtalis capture significantly more individuals in transformation than postmetamorphic frogs. On land, transforming individuals are less successful as escaping snakes than are juvenile frogs. The retention of the tail in transforming individuals appears to hinder saltatory locomotion. In water, transforming larvae appear to be hindered in their swimming by protruding forelimbs. By positioning themselves at the margins of ponds, snakes may increase their chances of encountering transforming anurans. By emerging at night, transforming anurans spend a disproportionately short time in metamorphic transformation. Snake predation and other hazards may have selected for the rapid metamorphosis of anurans.

Weatherby, Craig and Sheldon I. Guttman. (Auburn University and Miami University). Enzymatic Inheritance in the Queen Snake, Regina septemvittata.

A variety of enzymes and other proteins from various tissues of the progeny from 10 female Regina septemvittata were analyzed electrophoretically. The alleles of the polymorphic loci were inherited codominately in typical mendelian fashion.

Werner, J. Kirwin and Mark B. McCune. Amphibian Productivity in a Northern Michigan Pond .

Total amphibian productivity was estimated during the spring and summer of 1974 within an enclosed pond-marsh habitat in the Cyrus H. McCormick Experimental Forest, Baraga County, Michigan. Eight species were encountered within the study area, three of which, Notophthalmus viridescens, Rana catesbeiana, and R. pipiens were found only occasionally, did not appear to breed, and were not included in productivity estimates. Total productivity was estimated as 70 Kcal/m^2/yr. Individual figures were 27 Kcal/m^2/yr for Hyla crucifer, 14 Kcal/m^2/yr for Bufo americanus, 17 Cal/m^2/yr for R. clamitans, 6 Kcal/m^2/yr for R. septentrionalis, and 6 Kcal/m^2/yr for R. sylvatica. Approximately 95% of all productivity was involved in the growth and development of tadpoles.

Wills, Fred H. (Texas A&M University). Geographic Variation in Sceloporus parvus Smith.

The iguanid lizard Sceloporus parvus occurs in eastern Mexico along the Sierra Madre Oriental from northern Coahuila to Hidalgo. Two subspecies have been described to date. Examination of approximately 300 specimens revealed that intrapopulation variation of scalation is considerably greater than previously known. Data were analyzed using various univariate and multivariate methods. It was found that variation is essentially clinal from north to south within the species' distribution. A disjunct population in west-central Tamaulipas was found to be well-differentiated from other populations.

Wilson, A. C.[1], G. L. Bush[2], S. M. Case[3], J. L. Patton[3], and M.-C. King[4]. (1- University of California, Berkeley 2- University of Texas, Austin, 3- University of California, Berkeley, 4- University of California, San Francisco). An Analysis of Rates of Chromosome Evolution and Speciation in Vertebrates.

To test the hypothesis that organismal evolution is largely dependent on gene rearrangement, chromosomal diversity was examined in 225 genera of vertebrates also possessed a fossil record. Chromosomal evolution has been faster in mammals, which have also evolved rapidly anatomically, than in other vertebrates. Rates of protein evolution appear similar in all groups. Social structuring of mammalian populations may promote both rapid fixation of gene rearrangements and rapid speciation by effectively creating many small populations isolated from each other. Such small populations are not found in other vertebrates and consequently rates of chromosome evolution and speciation are much lower.

Wygoda, Mark L. (University of South Florida). Terrestrial Activity of Kinosternon baurii in a Seasonal Hardwood Swamp Forest.

A population of Kinosternon baurii was studied using the mark-recapture method from March, 1975 to April, 1976 in and around a temporary pond in Hillsborough County, Florida. Movements into and out of the pond were monitored by a drift fence and pitfall traps encircling the pond. Trailing devices were attached to the carapace of selected emigrants to determine direction and distance of terrestrial movement. A total of 157 captures was made on a marked population of 67 turtles. The sex ratio of 66 turtles was 1♂: 2.00♀. Terrestrial activity was positively correlated with incidence of rainfall 48 hours previous to capture. Turtle density in the pond was correlated with water level. Minimum densities occurred during lowest water levels when turtles were burrowed underground in the surrounding forest and during high water levels when turtles presumeably were foraging in nearby seasonal swamps.

Wortham, J. W. Edward, Jr. and Judith A. Murphy. (Old Dominion University). Scanning Electron Microscopy of Some Salamander Spermatozoa.

No Abstract Received.

Zappalorti, Robert T. (Staten Island Zoo). The Ecology of the Bog Turtle, Clemmys muhlenbergi, in Western North Carolina.

An ecological study of the bog turtle was begun in southwestern North Carolina in the spring of 1975. Populations were located in sphagnum bogs and marshy meadows at seven localities, and 54 individuals were observed during April, May and June. The physical and vegetational characters of each habitat were analyzed. The turtles were measured, weighed, individually marked, and released at the point of capture. Continuation of the investigation in the spring and summer of 1976 has resulted in a high frequency of recaptures of marked turtles, and has provided information on population structure, breeding habits, growth, activity and movements. (Research support by the Highlands Biological Station, Highlands, N.C., the National Audubon Society and the Staten Island Zoological Society).

ADDENDUM: Papers received late.

Gibbons, J.W., J.W. Coker and T.M. Murphy. (Savannah River Ecology Laboratory). Selected aspects of the Ecology of Rainbow Snakes, Francia erythrogramma.

No Abstract received.

Gibbons, J.W. and D.H. Nelson. (Savannah River Ecology Laboratory). The evolutionary significance of overwintering in the nests by turtles.

No Abstract received.



Gray Treefrog
Hyla versicolor

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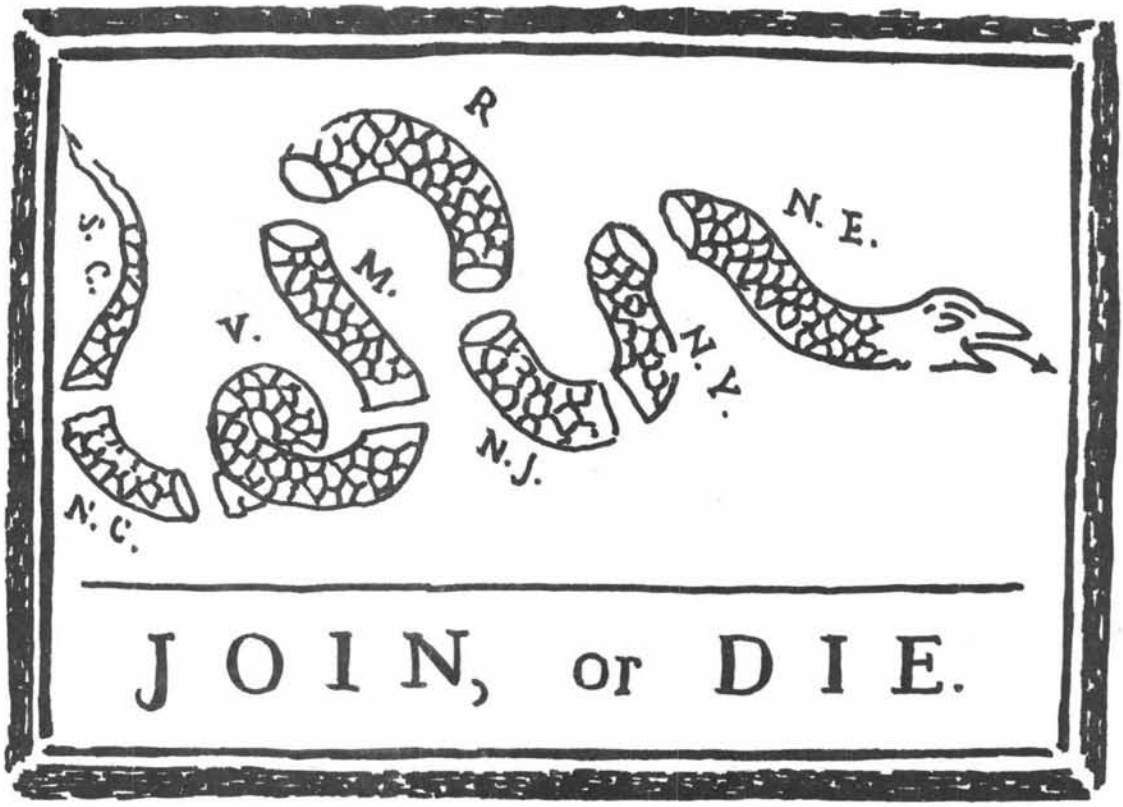
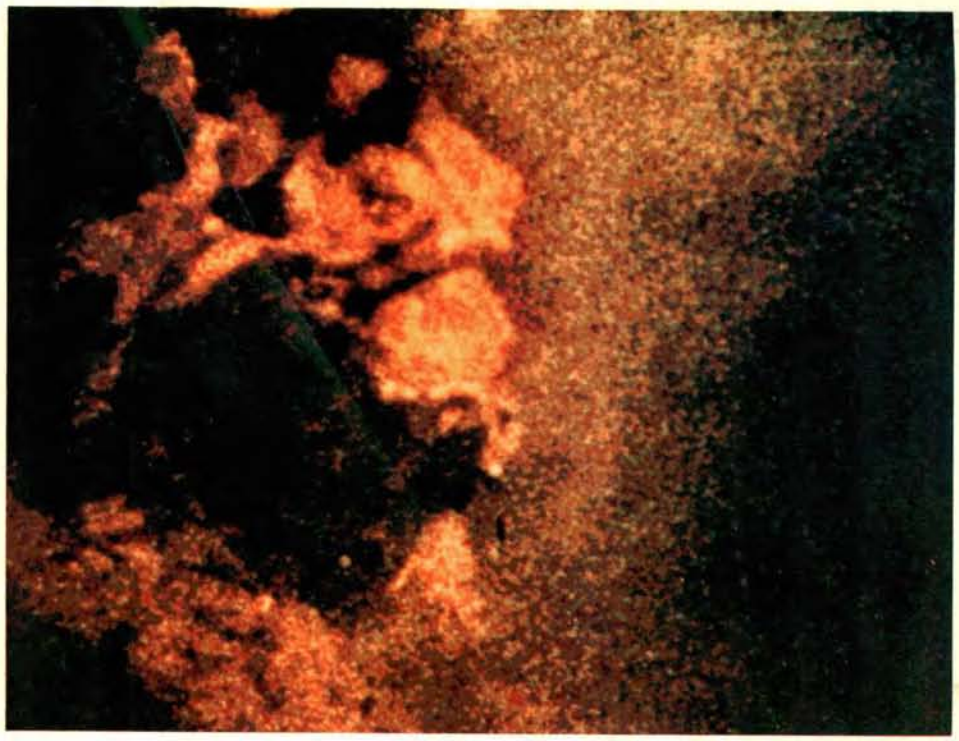




PLATE I (A) Photograph taken at 4:32 AM, 20 June 1975, purportedly of the upper body, neck and head; note absence from adjacent frames taken at 1.2 min intervals from center shot. Light cone and densitometric measurements indicate that "body" was at distance of 25 ft and "neck" was about 10 ft long.









(B) Photograph taken at 11:45 AM, 20 June 1975, showing "head". This series of six frames (intervals, 1.2 min) records a period of major disturbance, with the camera swinging upward; note bottom of boat, length 20 ft. The center shot, enlarged at right, is interpreted by Wyckoff's group as the head, showing bilateral symmetry in half-profile; note the mouth and nostrils at right and the several horn-like protrusions. An interpretive drawing by Sir Peter Scott is shown at bottom. The "head" was about 5 ft from the camera and is estimated to be 2 ft long. Camera-strobe arrangement for all photos in plate I is shown in fig. 4. (All photographs copyright Academy of Applied Science)

HERPETOLOGICAL REVIEW



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VOLUME 7, NUMBER 1

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CONTENTS

HERPETOLOGICAL PAPERS PRESENTED AT THE ZOOLOGICAL SOCIETY OF SOUTH AFRICA - SYMPOSIUM ON HERPETOLOGY AND ICHTHYOLOGY 2

IN THE NEWS 3

SSAR 1976 EDITORIAL COMMITTEE 4

PROFESSOR ARTHUR HUGHES - OBITUARY 5

I.C.Z.N. TO CONSIDER A PROPOSAL TO CONSERVE THE NAME RANA SPHENOCEPHALA COPE by Lauren E. Brown 5

SSAR THANKS SEARCHERS 8

SSAR CONTRIBUTORS 9

SSAR-HL MEETING 11

SSAR-HL REGISTRATION FORM 14

SSAR CALL FOR PAPERS 15

SSAR ABSTRACT FORM 16

CURRENT TITLES 21

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Herpetological Papers Presented at the Zoological Society of Southern Africa - Symposium on Herpetology and Ichthyology
Kruger National Park
1-5 September 1975

PROVISIONAL LIST OF PAPERS

SECTION A: REPTILIA

Prof. C. Gans, University of Michigan. Guest speaker.

D. Onderstal, Nelspruit. "Zoogeography of South African lizards."

G. van Aswegen, University of Pretoria. "The microanatomy of the digestive tract of the puffadder Bitis arietans."

Prof. E. Kochva, Tel-Aviv University. "Phylogeny of oral glands in reptiles."

Dr. G.R. Hughes, Natal Parks Board. "Irregular reproductive patterns in the Tongaland Loggerhead Caretta caretta."

Prof. H. Mendelssohn, Tel-Aviv University. Guest speaker. "Social behaviour in the genus Agama."

Dr. W.R. Branch, Atomic energy board. "The application of serotaxonomy to South African snakes."

D.K. Blake and Dr. J. Loveridge, Rhodesia. "Behaviour of the Nile Crocodile during the breeding season."

Mr. G.E.D. Blomberg, Botswana. "Basic biology of the Okavango Crocodile."

Dr. D. Bourn, Oxford. "Population dynamics of the giant tortoise."

C. Sapsford, University of Natal. "Temperature regulation during diving in the freshwater turtle Pelomedusa subrufa."

J.C. Grieg, Grahamstown. "The distribution of non-marine tortoises and turtles (Testudinata) in South Africa."

Prof. Y.L. Werner, Hebrew University of Jerusalem. "Distribution and variation of African geckos in extreme southwestern Asia."

E. Franckenberg, Hebrew University of Jerusalem. "Activity pattern and vocalisation in African geckos in southwestern Asia."

W.C. Haacke, Tvl. Museum. "Reptiles of the arid parts of South Africa."

Dr. W.R. Branch, Atomic energy board. "Survey of hemipenal morphology of South African snakes."

A.J.L. Lambris, Salisbury. "Surgical treatment of necrotic panophthalmitis in snakes."

SECTION B: AMPHIBIA

Prof. W.W. Mayhew, University of Calif. Guest speaker.

A. Channing, Natal University. "Agressive behaviour in Phrynomerus annectens."

Dr. D.E. van Dyk, Natal University. "Habits and dispersal of South African Anura."

N.I. Passmore, University of Witwatersrand. "The mating calls and breeding biology of the genus Ptychadena in South Africa."

Prof. Lamotte, Paris. "A propos des Ptychadena (Ranidae) de l'Ouest Africain."

Dr. J.P. Loveridge, University of Rhodesia. "Strategies of water conservation in Anura."

Dr. J.C. Poynton, Natal University. "Notes on the biology of Breviceps."

Prof. R. Laurent, Argentina. Guest speaker. "On the Hyperolius viridiflavus superspecies in Central Africa."

Dr. A. Schiotz, Denmark. "Ecological and zoogeographic patterns in the distribution of African treefrogs."

Dr. W.F. Blair, Texas. "Evidence for past interchange of anurans between Africa and other continents."

C.R. Parry, Queen Vistoria Museum. "Amphibian development in the larval stage."

Dr. J.M. Savage, University of Southern California. "Consumer organisation and interactions in two lowland tropical ecosystems: a comparison of herpetofauna and the leaf-litter community."

Dr. L.P. Knoepfeler, France. "Regime alimentair d'Aubria subsigillata au Gabon."

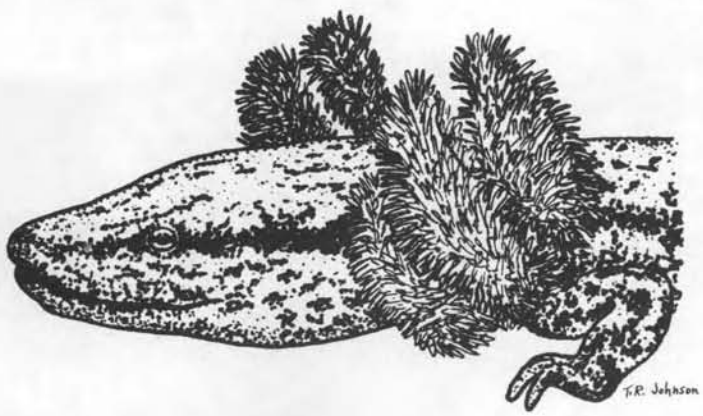
Fredric L. Frye, D.V.M., a specialist in the veterinary care of reptiles, will conduct an intensive three-day course, "Practical Husbandry, Medicine and Surgery of Captive Reptiles," on Friday, Saturday and Sunday, April 23, 24 and 25, 1976, at the Monteleone Hotel in New Orleans, La.

The course is intended for veterinarians, personnel in research and educational institutions, herpetologists, animal keepers and others concerned with the health care of reptiles.

Topics for slide-illustrated lectures and discussions will include: Husbandry, Medicine, Pathology, and Surgery.

The registration fee for the three-day course is $110. Advance enrollment is advised. A number of partial scholarships are available for full-time students; applications should be made to Dr. Nathan Cohen, University Extension. The California Academy of Veterinary Medicine will grant California veterinarians 15 credits toward membership; veterinarians in other states may request credit from their state associations.

For further details and hotel reservations, at reduced rates, write to Dr. Nathan Cohen, Continuing Education in Sciences and Mathematics, University of California Extension, Berkeley, CA 94720, or call (415) 642-1061.



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IN THE NEWS

Robert Herndon, or Aransas Pass, Texas, was bitten on the arm by a rattlesnake he was dissecting and that he had earlier "killed" by freezing.

AP in Milwaukee Journal

The fabulous Czimer brothers (Art and Richard) sell rattlesnake, lion and guanaco roasts in their Lockport, Illinois rare foods market. Although temporarily out of elephant trunk, they reportedly have "lots of rattlesnake meat."

UPI in Milwaukee Journal

An alligator ranch operator in Rockport, Texas, facing a jail term for marijuana possession, surrendered to police after a "20 hour holdout on a small island surrounded by an alligator filled moat."

UPI in Milwaukee Sentinel

Robert E. Gordon of Notre Dame University and former SSAR chairman, became president of the AIBS on 1 January 1976.

BioScience 25(12):814

Archie F. Carr of the University of Florida has received the 1975 Edward W. Browning Award for environmental conservation. He was given the $5,000 tax-exempt award by the New York Community Trust "for his efforts to preserve the green sea turtle and for his demonstrations of the global migration of marine turtles..."

BioScience 26(2):138

****

NOTICE

The Society for the Study of Amphibians and Reptiles wishes to announce its 1976 Editorial Committee for the series *Facsimile Reprints in Herpetology.*

Kraig Adler, *Editor*
Jaime Villa, *Assistant Editor*

Langmuir Laboratory
Cornell University
Ithaca, New York 14853 (U.S.A.)

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Jan Caldwell, Biological Survey of Kansas (U.S.A.)
Federico Medem M., Estacion de Biologia Tropical (Colombia)
Gunther Peters, Museum fur Naturkunde der Humboldt-Universitat (Germany)
Rolande Roux-Esteve, Museum National d'Histoire Naturelle (France)
Jay M. Savage, University of Southern California (U.S.A.)

The Society wishes to record its gratitude to the following persons whose service on the Editorial Committee is greatly appreciated: Francis R. Cook (Canada), Alan H. Savitzky (U.S.A.) and Michael Tyler (Australia).

****

N. C. STATE MUSEUM ANNOUNCES NEW JOURNAL

The North Carolina State Museum of Natural History announces a new journal, BRIMLEYANA, the Bulletin of the N.C. State Museum. Contents will emphasize the zoology and general ecology of the southeastern United States, especially North Carolina and adjacent areas. Consecutively numbered issued will appear at irregular intervals.

Information for potential contributors of BRIMLEYANA may be obtained from the Editor (Dr. John E. Cooper, Director of Research and Collections), and purchase and exchange information from the Managing Editor (Mrs. Sarah S. Robinson, Director of Publications) at: N. C. State Museum of Natural History, P. O. Box 27647, Raleigh, NC 27611. Dr. John B. Funderburg, Director of the Museum, is Editor-in-Chief.



Roberto Donoso-Barros
1922-1975

OBITUARY

Professor Arthur Hughes died suddenly from a heart attach on 13 Aug. 1975. He was a distinguished biologist, an exceptionally warm-hearted man and will be missed.

Arthur Hughes began working on neuro-embryological development as a student at Cambridge University in the early 1930's. Developmental biology, stimulated by the discoveries of Hans Spemenn, C.H. Waddington and others on induction mechanisms in embryos, was at a particularly exciting phase.

He worked at Cambridge until 1957 when he made the first of several visits to teach and research at the University of the West Indies in Jamaica. There he made the important discovery that one of the small Caribean frogs Eleutherodactylus martinicensis, an animal previously almost unknown to experimental embryologists, had remarkably few cells in its central nervous system and was therefore exceptionally valuable for studies on neuroembryology. After over thirty years of inspired and meticulous studies, he made fundamental discoveries on the relationships between cell numbers in the spinal cord and the onset of neuromuscular coordination and the development of behavior patterns in different species of animals.

It was typical of him to decide to emigrate to America in 1967 where in his late fifties continued to research actively as a Professor at the Developmental Biology Center at Case Western Reserve University, Cleveland. A good, kind man, with a wife, home and adopted country that he loved, his last years were perhaps some of his happiest. He deserved them.

EDITORS NOTE: The death of A. Hughes published in HR 6(4) referred to Arthur Hughes and not Andy Hughes. Andy Hughes informed us that he was alive and well at the University of Oklahoma.

I.C.Z.N. TO CONSIDER A PROPOSAL TO CONSERVE THE NAME RANA SPHENOCEPHALA COPE

In Aug. 1975 we submitted the manuscript "Request for the Conservation of Rana sphenocephala Cope, 1886, and the Suppression of Rana utricularius Harlan, 1826 and Rana virescens Cope, 1889 (Amphibia: Salientia)" for consideration by The International Commission on Zoological Nomenclature. On 11 Dec. 1975, R. V. Melville (Secretary, I.C.Z.N.) wrote us that the Commission has agreed to consider this proposal. An announcement that the proposal has been received will appear in the Bull. Zool. Nomencl., vol. 32, part 4 (probably in Jan. 1976) and the ms. will be published later in 1976. Mr. Melville has furthermore indicated that publication of the announcement automatically activates the revised Article 80 of the International Code of Zoological Nomenclature. That amendment specifies: "When a case is under consideration by the Commission, existing usage is to be maintained until the decision of the Commission is published." and "A case is deemed to be under consideration by the Commission from the date of publication in the Bulletin of Zoological Nomenclature of a notice of the reception of the application" and "the words 'existing usage' are to be taken to mean the most common usage." (Bull. Zool. Nomencl. 31 (2):89, 1974, and 32(2):65, 1975). The name R. sphenocephala has had far greater usage for the taxon under consideration than either of the names R. utricularius or R. virescens. Consequently, R. sphenocephala is the appropriate name until the Commission takes action.

Lauren E. Brown, Dept. of Biological Sciences, Illinois State University, Normal, Ill. 61761, Hobart M. Smith, Dept. of Environmental, Population and Organismic Biology, University of Colorado, Boulder, Colo. 80302, and Richard S. Funk, Dept. of Biological Sciences, Illinois State University, Normal, Ill. 61761.

MEETINGS

The 5th International Symposium on Animal, Plant and Microbial Toxins will be held in San Jose, Costa Rica on August 8-13, 1976 under the auspicies of the International Society on Toxinology and the University of Costa Rica.

Interested persons may write to:

Dr. Roger Bolaños
Instituto Clodomiro Picado
Universidad de Costa Rica
Ciudad Universitaria
San Jose, Costa Rica

SOCIETY OF SYSTEMATIC ZOOLOGY
May 30 to June 4

Higher Categories of Vertebrate Systematics:

This symposium, sponsored jointly by the Society of Systematic Zoology and the American Society of Zoologists is scheduled for June 3rd. The symposium will consider all groups of vertebrates within the framework of a cladistic reference system. Scheduled speakers are Gareth Nelson, Colin Patterson, Eugene Gaffney, Malcolm McKenna, Joel Cracraft, and Allan Brush.

MEETINGS

The Annual AIBS Meetings will be held 30 May-4 June at Tulane University, New Orleans, Louisiana. Within these meetings the American Society of Zoologists are preparing symposia including: 1) Communications and Display Behavior in Reptiles, 2) Higher Categories of Vertebrate Systematics, and 3) Endangered Wildlife (cosponsored with the Ecological Society of America). Contact: Dr. Eugene Gaffney, American Museum of Natural History.

HERPETOLOGIST

We anticipate an opening at the Assistant Professor level with appointment effective 1 September 1976. Duties are to include 1) development of a productive research program in one or more of the following areas of herpetology: biogeography, population biology, systematics, comparative behavior, or paleontology; 2) teaching in introductory general biology or zoology; 3) development of a specialized course and graduate program in herpetology; 4) supervision of organization and maintenance of herpetological collections. Applicant should have a Ph.D. and a strong commitment to research and teaching.

Applicants should send full curriculum vitae and names and addresses of three referees to Dr. James A. Slater, Biological Sciences Group, University of Connecticut, Storrs, Conn. 06268. Telephone: (203) 486-4323. Deadline for receipt of applications is 1 April 1976. The University does not discriminate against any person on the basis of race, color, religion, national origin, sex, age, or physical disability.

A NEW SPANISH HERPETOLOGICAL SOCIETY

The Asociacion Iberica de Herpetologia was founded October, 1975. If interested contact Carlos Perez-Santos, c/o Asociacion Iberica de Herpetologia, Estudio y Defensa de Los Reptiles y Anfibios, Avenida de Logrono, 23, Madrid-22 (Espana).

Robert W. Henderson of the Milwaukee Public Museum, and Henry S. Fitch of the University of Kansas have received a grant from the Banco Central in Nicaragua to study the large edible iguanas (*Ctenosaura similis* and *Iguana iguana*). The Bank is concerned about the status of these lizards and wants to determine what conservation measures can be taken to prevent their local extermination.

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NOTICE TO SUBSCRIBERS OF THE CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

Accounts 176-183 have already gone to the printer. If you have not resubscribed (for accounts 176-190) please do so as soon as possible to insure your being placed on the mailing list. Send the $6 to Henri C. Seibert, Zoology Bldg., Ohio University, Athens, Ohio 45701.

****

PUBLICATIONS RECEIVED

Fuchs, Karlheinz. 1974. Die Krokodilhaut. 183 pp. Eduard Roether Verlag, Darmstadt. 1 SBN 3 7929 000 74.

Romer, J.D. 1975. Annotated checklist with keys to the lizards of Hong Kong. Memoirs Hong Kong Nat. Hist. Soc. 10: 1-13.

Mount, Robert H. 1975. The Reptiles and Amphibians of Alabama. 347 pp. Auburn University, Dept. of Research Information, Agriculture Experiment Station, Auburn, Alabama 36830.

RECENT DEATHS

Barry Rothman, former editor of the Bulletin of the Philadelphia Herpetological Society, died of a heart attack on 13 January 1976 at the age of 40. Together with his former wife Norma, they were the prime movers of PHS for about 10 years.

HERPETOLOGICAL SKELETONS,SKULLS & SKINS. Send for illustrated pricelist to HERP OSTEO-SPECIMENS, 11324 Ventura Blvd., No. Hollywood, CA 91604.

****

The State of Florida has recently passed regulations protecting its endangered and threatened herps. As of 1975, it is illegal to take or possess or sell or offer for sale any of the following species without a permit from the Game and Freshwater Fish Commission: Endangered: Pine Barrens tree frog, all sea turtles except Loggerhead, East Coast saltmarsh snake, Short-tailed snake, American crocodile. Threatened: Keys Mud turtle, Suwannee cooter, loggerhead sea turtle, gopher turtle, Keys Moleskink, Sand skink, Big Pine Key ringneck snake, rosy rat snake, Miami black-headed snake, Key's populations of Brown and Ribbon snakes, and American alligator.

Permits are required for threatened species only where they are not regulated elsewhere in the regulations. The Gopher Tortoise, for example, still has a bag limit of 10 for food or whatever, even though considered threatened!

Any species which is also on the Federal Endangered Species list will require a federal permit in addition. Application for a federal permit should show evidence that a state permit has been obtained.

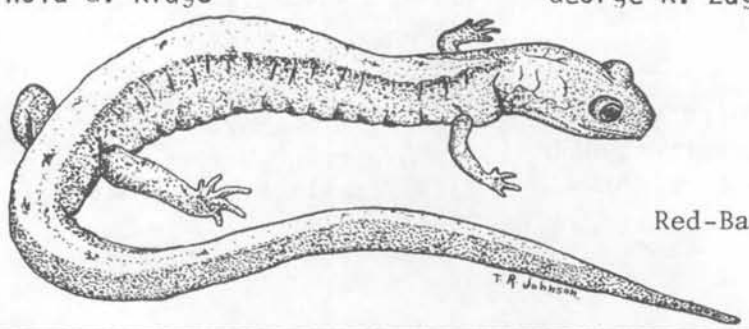
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"The Herpetofauna of the San Gabriel Mountains, Los Angeles County, California" by Allan A. Schoenherr will be published in early 1976 by the Southwestern Herpetologist's Society. Each of the 52 species accounts will include information on distribution, activity patterns, San Gabriel Mountain localities, and a range map. The book will be about 110 pp., illus. with 14 figs., 20 maps, 3 tables, and color cover. The book is available for $5.00 ($3.00 to Southwestern Herpetologist's Society members) from Linda Dandy, Southwestern Herpetologist's Society, 2344 Norwalk Ave., Los Angeles, Calif. 90041.

THANKS

SSAR and the entire herpetological community are indebted to the following searchers who have scanned the 408 journals surveyed during 1974-1975.

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Red-Backed Salamander

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

PUBLISHER OF THE JOURNAL OF HERPETOLOGY, FACSIMILE REPRINTS IN HERPETOLOGY, AND HERPETOLOGICAL REVIEW

TREASURER AND
PUBLICATIONS SECRETARY
HENRI C. SEIBERT
MORTON HALL
OHIO UNIVERSITY
ATHENS, OHIO 45701

Once again it is my pleasure to acknowledge the financial contributions made by so many (almost 8%) of our members which go to support many of our publishing endeavors, and to acknowledge those who contributed to the Conservation Fund which at the end of fiscal 1975 totaled $546.21.

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ANNOUNCEMENT OF SSAR - HL MEETINGS MIAMI UNIVERSITY, OXFORD, OHIO
8 - 12 AUGUST 1976

In addition to the contributed paper sessions Miami University is sponsoring a symposium entitled "Reproductive Biology of Amphibians" organized by Drs. Taylor and Guttman, Miami University, and moderated by Dr. Thomas Uzzell, Philadelphia Academy of Natural Sciences. The following speakers have accepted an invitation to participate in this symposium:

Dr. Leszek Berger
Dept. Agrobiology
Institute of Ecology
Polish Academy of Sciences
Poland
Topic: Systematics and hybridization in the Rana esculenta complex

Dr. Hansjorg Blankenhorn
Zoologisches Institute des Universitat
Zurich, Switzerland
Topic: Reproductive behavior in European Ranids

Dr. Giorgio Mancino
Instituto di Zoologia dell 'Universita
Pisa, Italy
Topic: Karyology, Cytogenetics and species hybrids of European newts

Dr. Stephen G. Tilley
Dept. of Biological Sciences
Smith College
Northhampton, Massachusetts 01060
Topic: Reproductive Ecology of North American Plethodontids

Dr. Steven J. Arnold
Dept. Biology
University of Chicago
1103 E. 57th St.
Chicago, Illinois 60637
Topic: Courtship behavior in North American Plethodontids

Dr. Max A. Nickerson
Vertebrate Division
Milwaukee Public Museum
Milwaukee, Wisconsin 53233
Topic: Reproductive biology of Paedogenic Salamanders

Dr. Lynne Houck
Museum of Vertebrate Zoology
Dept. of Zoology
University of California
Berkeley, California
Topic: Reproductive biology of Neotropical Salamanders

Dr. Hans Schneider
Zoologisches Institut
Universitat Bonn
Germany
Topic: Acoustic behavior and reproduction in European anurans

Dr. Murray Littlejohn
Dept. Zoology
University of Melbourne
Australia
Topic: Reproductive behavior and Ecology of Australian anurans

Dr. Toshijiro Kawamura
Dept. Zoology
Director of the Laboratory for Amphibian Biology
Topic: Review of the research program at the Japanese Amphibian Research Facility

Dr. Marvalee H. Wake
Dept. Zoology
4079 Life Science Building
University of California
Berkeley, California 94720
Topic: Reproductive biology of Caecilians

Dr. Robert Capranica
Section of Neurobiology and Behavior
Cornell University
Ithaca, New York 14850
Topic: Auditory processing of Vocalizations in Amphibians

Dr. Timothy Halliday
Dept. of Zoology
Animal Behavior Research Group
South Parks Road
Oxford, England
Topic: The comparative reproductive ethology of European newts. An evolutionary prospective.

The titles given above represent only working titles at this time. The full agenda of the symposium will be published in the June issue of Herp. Rev. 7 (2).

Schedule of Events:

The Meeting and the Symposium will be held in the Miami University Student Center.

8 Aug., Sunday	- 1200-1730	- Registration, Lobby, Miami Univ. Student Center
	- 2130	- SSAR Board Meeting, Room 237
9 Aug., Monday	- 0800-1200	- Registration
	1300-1700	- Registration
	- 0900	- Symposium on Reproductive Biology of Amphibians begins. Opening remarks by Dr. Uzzell in Heritage Room.
	- 0915-1145	- Symposium
	- 1330-1715	- Symposium
	- 2000	- Social
10 Aug., Tuesday	- 0900-1145	- Symposium
	- 1300-1515	- Symposium
	- 1545-1700	- Contributed Papers
	- 1700	- SSAR Business Meeting (Heritage Room)
	- 2000	- Chicken Dinner
11 Aug., Wednesday	- 0900-1200	- Contributed Papers
	- 1330-1715	- Contributed Papers
12 Aug., Thursday	- 0900-1200	- Contributed Papers (The number of contributed papers received will determine whether or not this session will be needed.)

An optional field trip to S.E. Ohio is also planned for Thursday. If you wish to go on this field trip, please fill out the attached form on the pre-registration sheet.

Housing: An air-conditioned conference dormitory is located one block away from the University Center. In anticipation that most people will want to make use of this facility, we have reserved room for at least 300 persons. Conference dormitory rates are: $6.00 per day per person for a double room and $8.50 per day per person for a single room (towels and sheets provided).

Room fees should be paid upon check-in. In order to facilitate check-in at the Conference Center, we would appreciate your filling out the housing form attached to the pre-registration packet and returning it when you pre-register. These facilities are convenient and are run in a manner similar to that of a motel. A limited number of family suites are also available. If you prefer to stay in a motel the following moderately priced motels are within three miles of campus:

College View Motel
South U.S. 27
Oxford, OH 45056
Tel: 513-523-6311

Oxford Motel
West 27
Oxford, OH 45056
Tel: 513-523-4166

Miami Motel
West 27
5235 College Corner Pike
Oxford, OH 45056
Tel: 513-523-6306

Camping Facilities: Both Tent and Recreational Vehicle Camping Sites (350) are located five miles away at Hueston Woods State Park.

Food: The University Union has a cafeteria, an excellent restaurant and two snack bars for meals and snacks. Additionally, restaurants in uptown Oxford are only a 10 minute walk. Recreational rooms and services will also be open during the meeting, i.e., bowling, pool tables, T.V. rooms, etc.

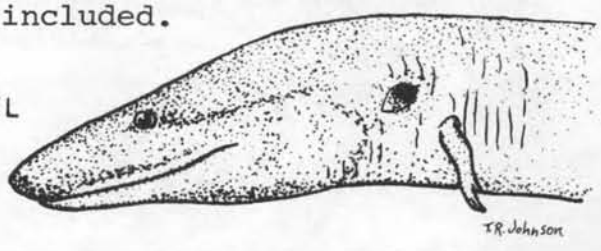
Extra-Meeting Activities: Activities for wives and children are also being planned eg., trips to Cincinnati Zoo, Cincinnati Art Museum, etc. Additional information about activities will be included in the June issue of Herp. Review.

Exhibits:

Live animals: A display of Ohio herps will be set up in the University Center. Ohio herpetologists are encouraged to assist in developing this exhibit. Anyone who can lend Ohio herps for this purpose please contact Sheldon Guttman, Dept. Zoology, Miami Univ., Oxford, OH 45056 (Tel:513-529-4595).

Herp Art Showing: A number of people have indicated an interest in displaying paintings, and other artwork, of amphibians and reptiles at the meeting. A room has been reserved for this purpose at the University Center. Anyone who wishes to exhibit paintings, photographs, sculpture etc., please contact Douglas H. Taylor, Dept. Zoology, Miami Univ., Oxford,OH 45056 (Tel:513-529-4901) by 2 August 1976 relative to what, what size and how many items you wish to exhibit. Any information related to needs in order arrange your exhibit should also be included.

THREE-TOED CONGO EEL
1-2½ feet
(paedogenic)



REGISTRATION FORM
SSAR-HL MEETING
8-12 August, 1976
Miami University

The registration fee includes the cost of meeting rooms, social, coffee breaks, printing and mailing, chicken Bar-B-Que, etc. Pre-registration is $10.00. Registration after August 2 and at the meeting will be $12.00. ONLY send in pre-registration and group photo payments now. Pay for housing upon check-in.

NAME_____

ADDRESS_____

_____ZIP CODE_____

ARRIVING_____LEAVING_____
(DAY, DATE) (DAY, DATE)

HOUSING REQUIREMENTS
(Pay for housing upon check-in)

_____ Nights double occupancy at $6.00/night/person

_____ Nights single occupancy at $8.50/night/person

FAMILY ACCOMMODATIONS: A limited number of family suites are available.

_____ Number of beds needed at $6.00/night/person

PRE-REGISTRATION

_____ Pre-registration fee(s) at $10.00 per person = $_____

_____ Group photos (B&W, 8 x 10) at $1.00 (postage included) = $_____

MAKE CHECKS PAYABLE TO: SSAR-HL; MIAMI UNIVERSITY
MAIL THIS FORM BY 26 JULY, 1976 TO DOUGLAS H. TAYLOR
DEPARTMENT OF ZOOLOGY, MIAMI UNIVERSITY, OXFORD, OHIO 45056

AIRPORT PICK-UP FORM
(Cincinnati, Oh. Airport ONLY)

I will be arriving at Cincinnati on _____Flight Number_____
(Airline)
on_____at_____; use time as indicated by airline. Cincinnati is EDT.
(Day, Date) (Time)
Look for someone holding a sign saying "SSAR-HL" in front of the TWA ticket counters.

FIELD TRIP FORM

_____ I would like to go on a field trip to Scioto and Adams County.

_____ I will be able to supply a vehicle in which, in addition to myself, I have space for ____ riders in addition to those who already plan to ride with me

_____ I will not have a vehicle and need a ride. I have arranged to ride with _____.
(Name of Driver)

****ALL FORMS MAY BE MAILED TOGETHER OR SEPARATELY. SEND TO: DOUGLAS H. TAYLOR, DEPARTMENT OF ZOOLOGY, MIAMI UNIVERSITY, OXFORD, OHIO 45056

ANNUAL MEETING
SOCIETY FOR THE STUDY OF AMPHIBIANS & REPTILES
and
THE HERPETOLOGIST'S LEAGUE
JOINT MEETING
Miami University, Oxford, Ohio
8-12 August, 1976

C A L L F O R P A P E R S

We expect that this will be a large meeting due to the central location of the meeting site and also since the American Society for Icthyologists and Herpetologists is meeting in Alaska in 1976. Therefore, in order to facilitate the organization of the meeting, it is necessary to set the 15th of May, 1976 as the deadline for receipt of titles and abstracts for contributed papers.

Each senior author will be limited to one paper presentation each and ordinarily will be restricted to a 15 minute time limit (which includes paper presentation and questions). An abstract of no more than 200 words must accompany this form to qualify for inclusion in the program (see other side). If an abstract is not received, the paper will be treated as a "title only" contribution.

PLEASE NOTE THE DEADLINE: 15 May, 1976
(SEE OTHER SIDE FOR ADDRESS)

(PLEASE PRINT OR TYPE)

TITLE_____

_____

AUTHOR(S):_____

_____

COMPLETE MAILING ADDRESS OF THE FIRST AUTHOR:

_____

_____

SLIDE PRESENTATIONS ARE RESTRICTED TO 2" X 2" PROJECTORS.

EQUIPMENT NEEDED: 2" X 2" Slide Projector_____
16 mm Movie Projector_____
Other_____

CATEGORY IN WHICH YOUR PAPER SHOULD BE PLACED:

Anatomy ( ); Behavior ( ); General Ecology & Life History ( ); Genetics and Populations ( ); Physiology ( ); Techniques ( ); Systematics, Evolution or Zoogeography ( ); Other ( ).

Is presentation of a paper a requirement for your attendance at the meeting?_____
If yes, does this mean that you will not receive funds or time for travel if your paper is not on the program?_____

A B S T R A C T F O R M

Write abstracts in a single paragraph. Normally employ complete, connected sentences, active verbs, and the third person. Use nontextual material such as short tables and structural formulas only when no acceptable alternative exists. Employ standard nomenclature, or define unfamiliar terms, abbreviations, and symbols the first time they occur in parens; and title. The allotted space is adequate for a 200-word abstract.

SAMPLE

WORTHINGTON, RICHARD D. (Univ. Texas El Paso). Density, growth rates and home range sizes of Phrynosoma cornutum in southern Dona Ana County, New Mexico.

In the summers of 1970-72, horned lizards, Phrynosoma cornutum, were studied in a Larrea-Yucca community near Anapra, Dona Ana Co., New Mexico. In July, 1971, the density was 1.64 individuals per hectare. Preliminary data on home range size revealed large home ranges measuring up to 1.08 ha (minimum polygon method). Hatchlings were first seen in the fall and were found to increase in snout-vent (s-v) length at a rate of 0.6 mm/day during their first summer. Lizards larger than 90 mm s-v showed little subsequent growth.

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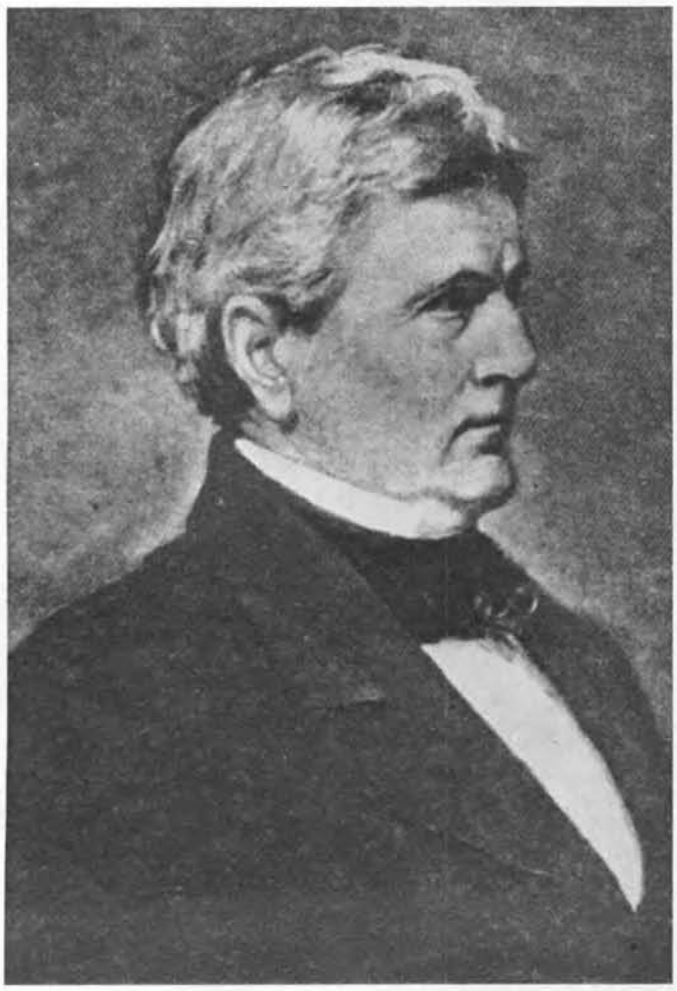
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FULL DETAILS ON THE FOLLOWING PAGES

HOLBROOK'S designation as the Father of American Herpetology rests upon his major work, *North American Herpetology,* published over a century ago. Nothing surpassing it in size or beauty has ever been produced on the same subject, before or since. Holbrook's life's ambition was to publish descriptions of all known species of American fish, amphibians and reptiles, illustrated from life and in color much as his friend Audubon had done for the birds and mammals. But he surpassed Audubon in producing a beautifully-illustrated as well as scientifically-important book which, according to Agassiz, compelled Europeans for the first time to take notice of American science.

Holbrook was a physician by profession but spent most of his labor and fortune in producing his books on herpetology. He was a perfectionist and the color illustrations became an obsession with him. He employed the best wildlife artists of the day and in nearly every instance illustrated each species from living specimens. These were sent to him from all parts of the continent by his many correspondents, a veritable who's who of early American naturalists, among them DeKay, Kirtland, Harlan, Troost, Green, LeConte, Blanding, Storer and Nuttall. A first edition was issued in 1836-1840 but Holbrook became dissatisfied with it and he would sometimes refuse to send a new volume to a subscriber until the earlier one had been returned to be destroyed.

In 1842, Holbrook issued the complete second edition of his great work. This is considered the definitive edition and thus is the one being reprinted. Many plates were re-drawn and each species illustrated with a full-page plate. The text includes a detailed description of each species with sections on color, size, distribution, habits and remarks. Holbrook's style of writing is particularly lucid: referring to the diamondback rattlesnake, he said "A more disgusting and terrific animal cannot be imagined than this; its dusky colour, bloated body and sinister eyes of sparkling grey and yellow, which combine to form an expression of sullen ferocity unsurpassed in the brute creation". As Holbrook had originally intended, the book still retains its great interest both for the scientist and the serious amateur.



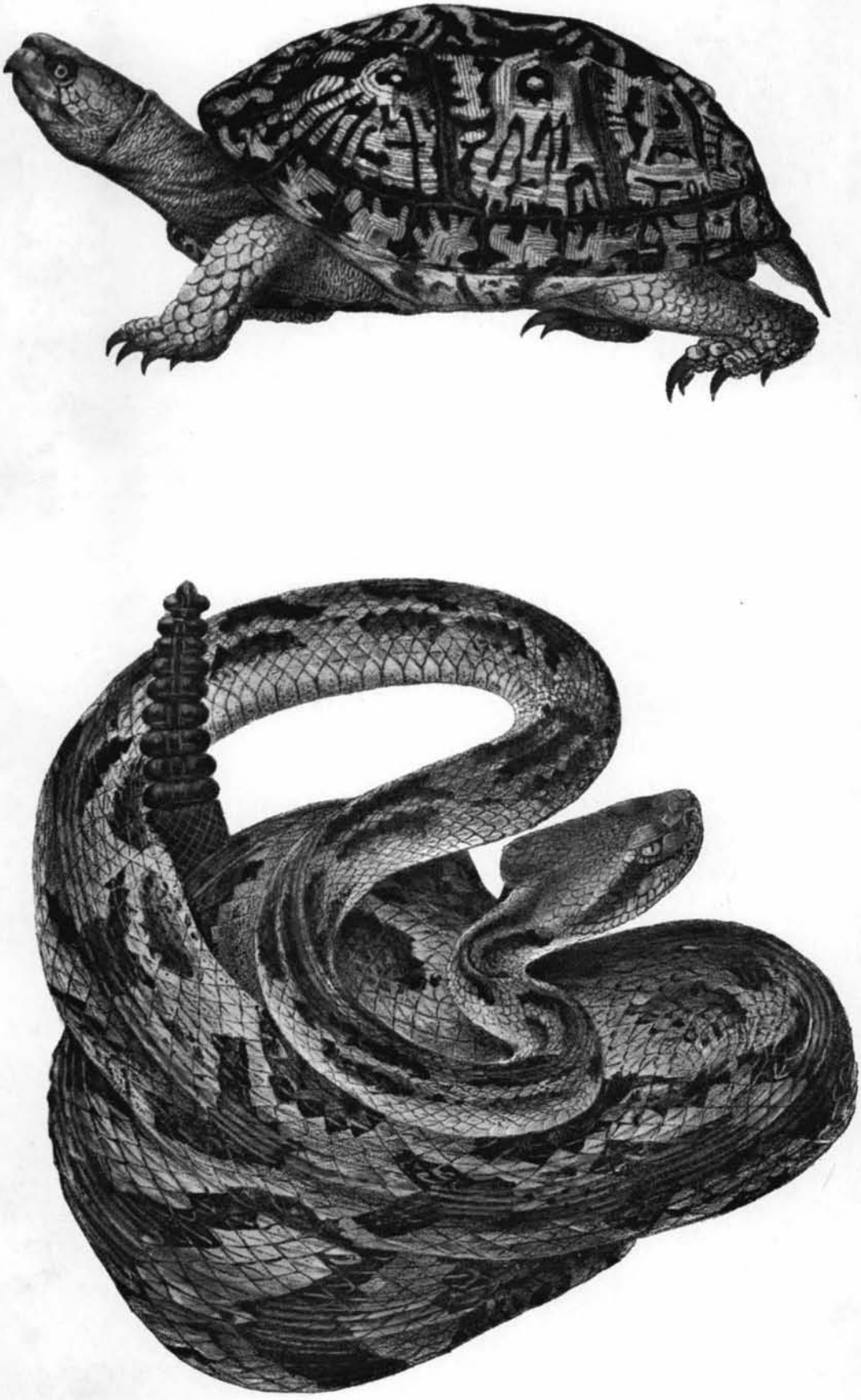
THE REPRINT EDITION. Due to the small number of copies printed and the value of the exquisite plates for framing, originals of Holbrook's magnificent treatise long ago became collector's items. These now command prices of nearly $4000 a set on the second-hand market, making it one of the most costly natural history books ever published.

The reprint will be an exact facsimile of the entire 5-volume second edition, including all 147 of the plates. Nineteen of *the best plates will be reproduced in full color* including representative snakes, lizards, turtles, frogs and salamanders. The reprint is planned to match the quality and imposing size of the original: pages will measure 8½ by 11 inches (21.5 by 28 cm), the text will be printed on special acid-free paper that lasts for centuries and the whole will be sewn and sturdily bound in heavy library buckram.

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THE PATRON'S EDITION. As was common practice in those days, the costs of publishing Holbrook's books were partially borne by patrons who subscribed to them in advance. In keeping with this, a patron's edition is being offered. This special edition will be *strictly limited to only 150 copies* and is designed to become a collector's item. Each copy will be signed by the authors of the introduction and individually numbered by the editor. *A list of patrons* will be recorded for posterity on a special page in both the regular and patron's editions. Patron's copies will be richly hand bound by the eminent American book craftsmen Fritz and Trudi Eberhardt. Our intent is to duplicate the bindings of Holbrook's originals, produced at a time when binding itself was an art. These will be constructed of the finest imported materials: scarlet-red morocco leather spine and corners over genuine hand-marbled boards with 24-karat gold top edge and ornamentation. The patron's edition is illustrated on the order form.

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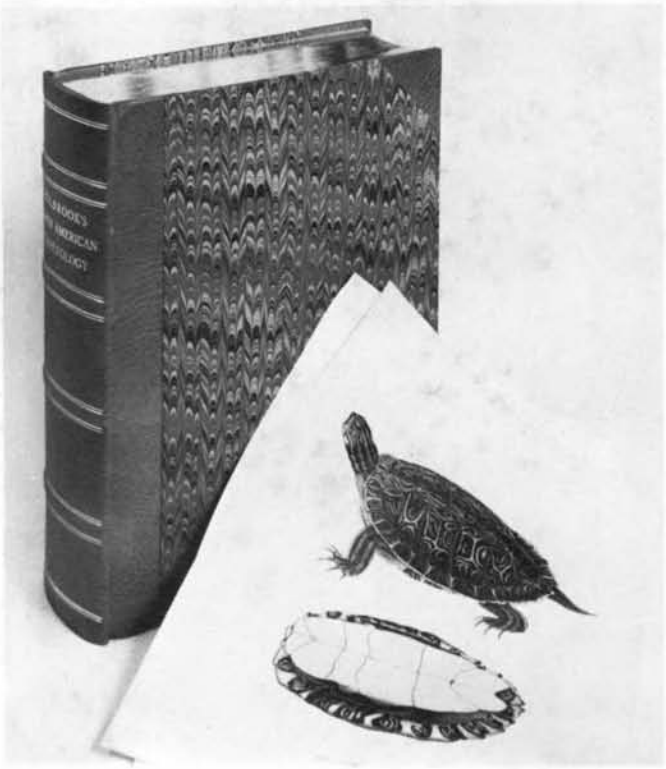


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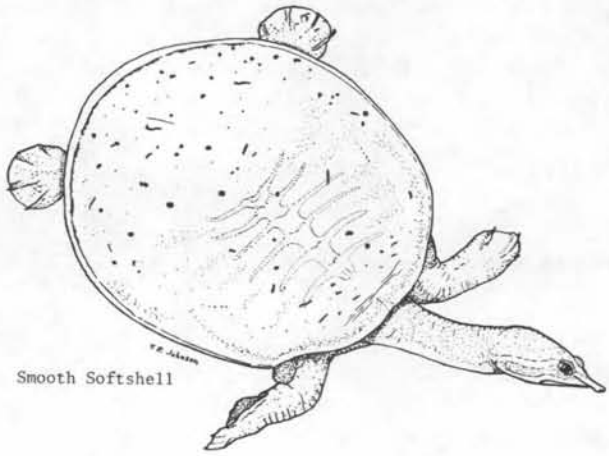
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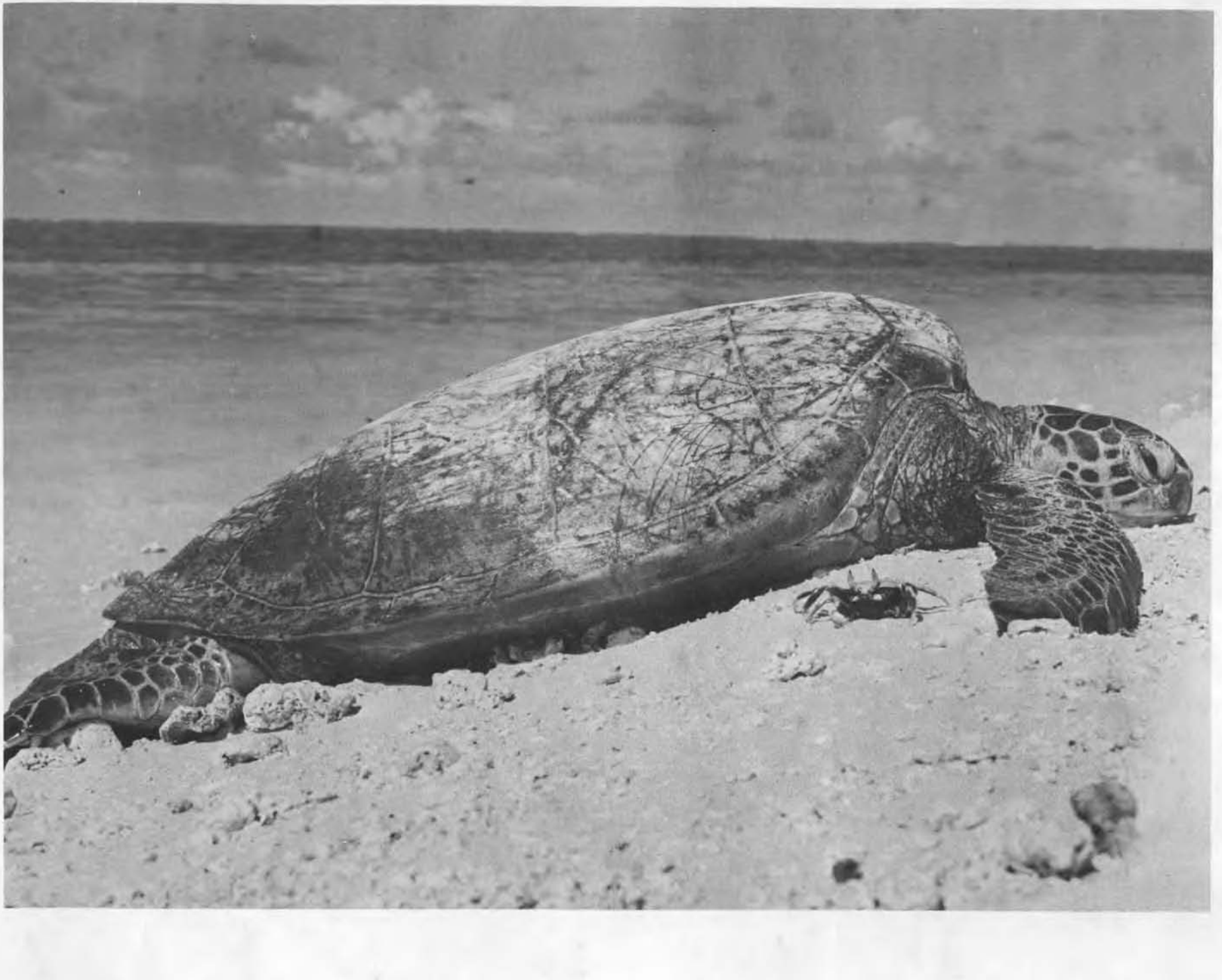
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COVERS

FRONT: Drawing by Judith Knight, MPM.
BACK: Hawaiian green turtle (Chelonia mydas agassizi) and ghost crab (Ocypode ceratophthalmus) basking on the beach at French Frigate Shoals. Populations of green turtles throughout the world have declined significantly due to habitat destruction and overexploitation for commercial purposes. George H. Balazs, Univ. of Hawaii at Manoa.
DRAWINGS in text by Tom R. Johnson, St. Louis Zoo.



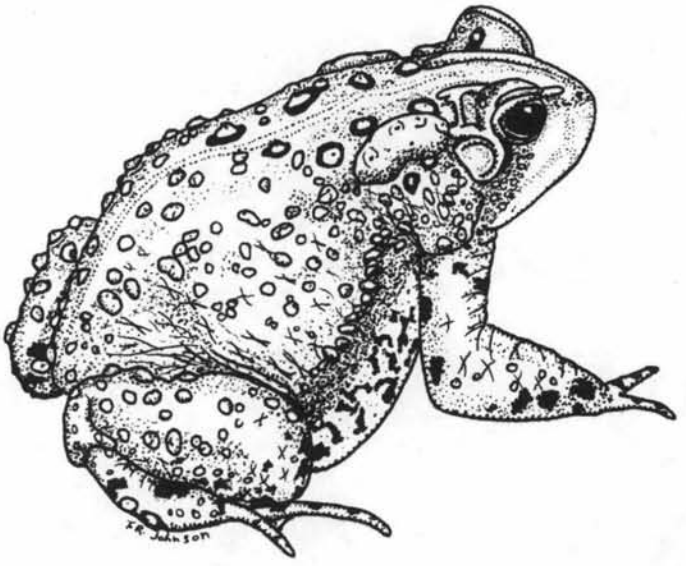
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VOLUME 6, NUMBER 4

DECEMBER, 1975

CONTENTS

FROM THE EDITOR..... 98

SSAR BUSINESS MEETING, FULLERTON, CALIFORNIA..... 99

SSAR/REGIONAL SOCIETIES INTERACTION by George R. Pisani..... 101

PRELIMINARY LIST OF REGIONAL HERPETOLOGICAL SOCIETIES..... 102

SSAR ELECTION RESULTS..... 104

HERPETOLOGICAL SPEAKERS BUREAU..... 104

BOOK REVIEW "REVISION DER GECKONIDENGATTUNG PHELSUMA GRAY, 1825" BY ACHIM-RUDIGER BORNER...Henri Seibert..... 104

THE SIGMA-XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1974-75 AND 1975-76 IN "HERPETOLOGY" 106

NEW LEASE OF LIFE FOR DARWIN'S GIANT TORTOISES..... 107

PHILODRYAS OLFERSI (LICHENSTEIN) NEW TO COLOMBIA AND VENEZUELA by Robert A. Thomas and James R. Dixon..... 108

BOOK REVIEW: "XENOPUS: THE SOUTH AFRICAN CLAWED FROG" BY ELIZABETH DEUCHAR...Henri Seibert..... 109

NEW PUBLICATIONS..... 110

HERPETOLOGICAL "LIFE LIST" by John S. Applegarth..... 110

A NEW METHOD FOR TRAPPING SOFTSHELL TURTLES by Keith M. Robinson and George G. Murphy..... 111

GALAPAGOS TORTOISE HATCHES AT PHILADELPHIA ZOO by J. Kevin Bowler..... 114

CONSERVATION NEWS..... 114

GEOGRAPHIC DISTRIBUTION..... 115

RECORD SIZE PHRYNOSOMA DOUGLASSI by Joseph C. Mitchell..... 117

AN ENCLOSURE DESIGN FOR STUDYING TERRESTRIAL SALAMANDERS by Fred Lotter..... 117

CURRENT LITERATURE..... 118

DEATH FEIGNING BY THE WESTERN COACHWIP SNAKE by Donald D. Smith... 126

NOTES ON THE EGG LAYING HABITS OF DEIROCHELYS RETICULARIA..... 127

IN THE NEWS.....127

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MILWAUKEE PUBLIC MUSEUM

1 December 1975

FROM THE EDITOR

The past year has been a busy and trying one for SSAR and Herpetological Review. During 1974 and 1975 we published 128 pages annually. In 1976 we will try to publish 144-152 pages (budget-dependent).

There have been some problems! Although we have published HR on schedule or no later than two weeks behind schedule, you sometimes received it months afterward. The reason for tardiness was because we shipped HR to Ann Arbor where it had to wait for other SSAR publications before shipment to you. With HR 6(2) we began individual shipment from Milwaukee. This means that the entire operation except label generation, journal scanning and initial section editing is now down at MPM. We must have considerable volunteer effort to accomplish this task. I take this opportunity to thank the following individuals who have donated their time and efforts in the production and dissemination of HR 6: Robert Henderson, Jeffrey Briggs, Sue Pleskatcheck, Teresa Noeske, Jean Rodey , Steven Yeo, Barbara Villa, Jon Shapiro, Diane Stevenson, Cheryl Castelli, Karen Slowiak, Karen Heerhold, Patricia Twinem, Nathan Kraucunas, Richard Sajdak, Craig Morrell and Gayle Davis. We extend a special thanks to Dr. Kenneth Starr, MPM's Director, for his continued support and understanding.

Happy Holidays,

M.A.N.

SSAR BUSINESS MEETING

13 August 1975

Fullerton, California

The Business Meeting of the SSAR was called to order at 11:15 a.m. by Chairman Worthington. In opening the meeting, Worthington noted that a quorum of SSAR members was not present and therefore the meeting should be viewed as informal.

Treasurer's Report: Henri Seibert stated that at least for 1976 there will be no need to increase the Society's dues. In fact, the SSAR has sufficient funds to support a number of new and innovative services for the herpetology community. For example, a translations service will be initiated under the direction of Roy McDiarmid (University of Southern Florida, Tempa); a brochure on threatened and endangered amphibians and reptiles, compiled by Ray Ashton, will be published; and a speakers bureau will be established through the Liaison Committee (Jim Murphy, Chairman). In addition, the SSAR will continue to contribute to worthwhile conservation projects and shall provide a contribution to the Zoological Record this year.

Seibert announced that the membership of the SSAR (in August) was 5.5% greater than it was at the end of last year.

Chairman's Report: Worthington stated that the Board had met for eight hours on Sunday, 10 August, at which time a number of decisions were made. [Copies of the Board Meeting minutes are available upon request from the Secretary: Stephen R. Edwards/ Association of Systematics Collections/ Museum of Natural History/ University of Kansas/ Lawrence, Kansas/ 66045.]

Of particular interest, the Board approved the 1977 meeting site at the University of Kansas, Lawrence; the budget for the Journal of Herpetology was increased by 15%; and, the Facsimile Reprint Series will undertake publication of Holbrook's "North American Herpetology, 2nd Edition" and McIlhenny's "The Alligator's Life History."

The Student Prize for 1975 for the best student paper published in the Journal of Herpetology was awarded to Eliezer Frankenberg for his paper entitled "Vocalization of Males of Three Geographic Forms of Ptyodactylus from Israel," J. Herp. 8(1):59-70. The prize carries a $100.00 award.

Nominating Committee Report: Worthington reported that the ballots for the election of officers and directors for 1976 will be distributed in September. The Nominating Committee has proposed the following candidates: Chairman-Elect, W. Ronald Heyer and Max A. Nickerson; Secretary, Stephen R. Edwards; Treasurer, Henri C. Seibert; Board Members (two of which will be elected) Robert L. Bezy, Laurence M. Hardy, Harry W. Greene, and Richard R. Montanucci. No additional nominations were offered from the floor.

Worthington stated that the Board has proposed that the By-laws be amended to increase the number of Directors from four to six. Ballots for this amendment will be distributed with the ballots for the election of officers and directors. If this amendment passes, the change in the number of directors will take effect in 1977.

In other matters, Worthington noted that the Secretary has been charged with evaluating the pros and cons of securing corporate status for the SSAR during the next year.

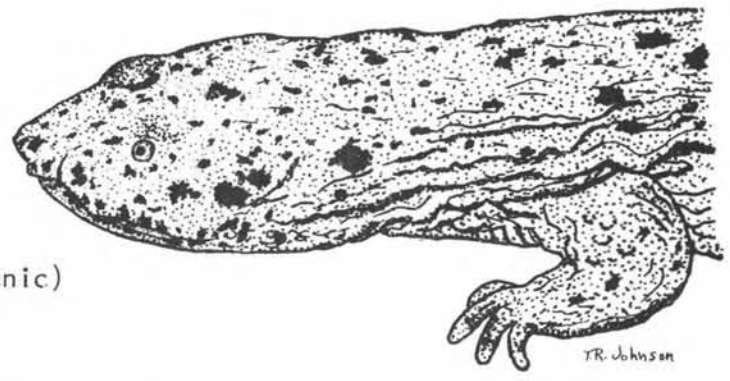
John Applegarth presented the following resolution which was adopted unanimously by those in attendance:

> For their help and hospitality which has made this meeting a success, the Society for the Study of Amphibians and Reptiles and the Herpetologists' League jointly express their most sincere appreciation to the local committee chaired by William Presch and John W. Wright and staffed by Andy Hughes, Joel Weintraub, Lou Mitchell, Mick Bondello, Ron Whiteman, Carl Babb, Doug Allan, Al Romspert, Jim Lacky, Becky Papendick, Curt Gage, and Robert Bezy and the institutions of California State University at Fullerton and Pacific Christian College.

Respectfully submitted,

Stephen R. Edwards

Stephen R. Edwards
Secretary



HELLBENDER
12-20 Inches
(Partially paedogenic)

SSAR/REGIONAL SOCIETIES INTERACTION

With the publication of Herpetological Circular No. 4 (mailed with J. Herp. 9 (4)),. SSAR has taken a major step towards uniting the herpetological community's resources to advance the discipline as a whole. In June 1975, I presented a proposal for financial interaction between SSAR and regional societies to the SSAR Liaison Committee. This proposal was based upon the beliefs that:

1) regional societies may sometimes wish to undertake very worthwhile herpetological projects, but may be prevented from so doing by very limited finances;
2) combined, the regional societies represent a considerable intellectual and financial herpetological resource;
3) while national and international societies'financial bases are relatively large, they are distinctly, finite.

I felt that some potentially valuable herpetological goals were being restricted by limited funds, and had an example at hand.

The Kansas Herpetological Society, while not condoning the capture and sale of reptiles for pets, does recognize that these animals constitute popular and legitimate trade items. KHS felt it futile to try to totally restrict such trade, and indeed recognizes that many current "professional" herpetologists began by keeping and observing their own live collections while youngsters. Therefore, we desired to make a strong effort to improve the fate of captive reptiles maintained by private individuals, schools, and pet shops. A manuscript submitted to Herpetological Circulars appeared to be a very positive step in the direction KHS wanted to go. It was comprehensive in its coverage of ailments most commonly afflicting reptiles maintained by individuals, schools and pet shops; it was in a concise outline form and hence readily followed by the layman; it was brief enough to be marketed cheaper than any similar publication. KHS felt that if it could cosponsor the publication with SSAR, KHS could accomplish an objective which would otherwise be financially beyond it and SSAR would be able to put any money saved towards other worthwhile projects. Hence, the above-mentioned proposal was born.

Realizing that most regional societies no doubt faced the same problems, the proposal was phrased in general terms, using the desired KHS/SSAR interaction as an immediate example. At its annual meeting, SSAR's Board of Directors accepted the working principles of the proposal on a trial basis. Herpetological Circular No. 4 went to press shortly thereafter. SSAR and KHS are indebted to Ms. Mary Makepeace (1320 Valley Land, Lawrence, KS) for her help in preparing Herp. Circ. No. 4 and cover designs.

The possible range of projects which could be cosponsored is very broad, and simultaneously is regulated by relative merit of specific proposals, SSAR priorities and available funds. Interested societies are urged to direct inquiries to James B. Murphy, Chairman -- SSAR Liaison Committee -- Dallas Zoo -- 621 E. Clarendon Drive -- Dallas, Texas 75203.

George R. Pisani
President, KHS
Biology Dept.
Univ. of Kansas
Lawrence, Kansas 66045

PRELIMINARY LIST OF REGIONAL HERPETOLOGICAL SOCIETIES

The SSAR, through the efforts of the Liaison Committee, is attempting to establish a much closer relationship with regional herpetological societies. In order to accomplish that end, questionnaires were sent to all of the societies for the purpose of compiling a current list and to gain some input as to how SSAR might be of greater assistance to regional societies.

The Committee members, Stanley Dyrkacz, Tom Johnson, Gopher Kuntz, Michael Long and Malvin Skaroff, prepared questionnaires which covered the following topics: status of the society, hierarchy of the organization, membership, publications, frequency of meetings, and other pertinent information. The response was less than overwhelming and the list reflects the amount of information that was returned. The status of many societies could not be determined so any corrections or additions would be welcome. Please send all information to:

James B. Murphy, Chairperson
SSAR Liaison Committee
621 E. Clarendon Dr.
Dallas Zoo
Dallas, TX 75203

When additional information is gathered, a revised list of societies will be published.

- - - - - - - - - - - - - - -

AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS
Mailing address: Division of Reptiles and Amphibians
U.S. National Museum
Washington, DC 20560

ARIZONA HERPETOLOGICAL ASSOCIATION
c/o Peggy Scheitlin
2507 E. Devonshire
Phoenix, AZ 85016

(Letter returned - no such address)

ASSOCIATION FOR THE CONSERVATION OF TURTLES AND TORTOISES (ACTT)
P.O. Box 23
N. Hackensack Station
River Edge, NJ 07661

(Membership: 12)

BAY AREA TURTLE AND TORTOISE CLUB
c/o Sue Hillbun
176 Mission
San Rafael, CA 94901

Editor: Connie Cembura
5919 N. Arlington
San Pablo, CA 94806

Publications: Monthly Newsletter

BI-STATE TURTLE AND TORTOISE SOCIETY
c/o Frederick G. Wastholz
32 Leonon Pkwy.
Old Tappan, NJ 07675

BUTTE COUNTY TURTLE AND TORTOISE ASSOC.
c/o Sean McKeown, Pres.
112 Shasta Hall
Chico, CA 95926

(No Reply)

CALIFORNIA TURTLE AND TORTOISE CLUB
Box 90252
Los Angeles, CA 90009

Ellen Beattie, Editor
22419 Warmside Ave.
Torrance, CA 90505

Meetings: Monthly

CANADIAN AMPHIBIAN AND REPTILE CONSERVATION SOCIETY
c/o Barbara Froom
8 Preston Place
Toronto 12, Ontario
Canada

CHICAGO HERPETOLOGICAL SOCIETY
2001 N. Clark St.
Chicago, IL 60614

Stanley Dyrkacz, Pres.

Membership: 250+
Meetings: Monthly
Publications: Newsletter monthly, bulletin quarterly

COLORADO HERPETOLOGICAL SOCIETY
P.O. Box 15381
Denver, CO 80215

Louise Turner, Secy.
Martin Balt, Pres.

Meetings: Monthly
Publications: Newsletter monthly, annual bulletin

CONNECTICUT HERPETOLOGICAL SOCIETY
c/o Tom Prescher, Pres.
23 Grandview
Tolland, CT 06084

Membership: 114
Meetings: Monthly
Publications: Monthly newsletter, annual bulletin

DALLAS HERPETOLOGICAL SOCIETY
c/o Wayne Seifert
Dept. of Herpetology
Dallas Museum of Natural History
P.O. Box 26193
Dallas, TX 75226

EASTERN SEABOARD HERPETOLOGICAL LEAGUE
c/o Malvin L. Skaroff, Coordinator
1025 Lakeside Ave.
Philadelphia, PA 19126

EL PASO HERPETOLOGICAL SOCIETY
c/o Bob Cooper
3424 Sunnyside
El Paso, TX 79904

(No Reply)

FLORIDA HERPETOLOGICAL SOCIETY
c/o Gopher Kuntz, Secy.
6641 Rivo Alto Ave.
Orlando, FL 32809

Doug Haggard, Pres.

Membership: 40
Publications: Monthly newsletter

FLORIDA WEST COAST HERPETOLOGICAL AND CONSERVATION SOCIETY
c/o Robert W. Marek
3027 Pine Tree Ave.
Largo, Fl 33540

FLORISSANT HERPETOLOGICAL SOCIETY
c/o Gary R. Boyd
42 Radford Dr.
Florissant, MO 63031

(No Reply)

FREE STATE HERPETOLOGICAL SOCIETY
c/o Clyde Prince
Box 285
Carter Lane
Elvaton
Millersville, MD 21108

GREAT LAKES HERPETOLOGICAL SOCIETY
c/o James Todd, Pres.
15554 Cooper
Taylor, MI 48180

Membership: 86
Meetings: Monthly
Publications: Quarterly bulletin

GREATER GAINESVILLE BIOLOGICAL PARKS SOCIETY, INC.
c/o Eddie Leach
2131 N.W. 55th St.
Gainesville, FL 32605

Robert W. Simons, Pres.

Membership: 50
Meetings: Monthly

GULF COAST HERPETOLOGICAL SOCIETY
c/o John Zapata, Pres.
P.O. Box 1562 Houston Zoo
Houston, TX 77001

Membership: 25
Meetings: Monthly
Publications: Monthly newsletter

HERPETOLOGISTS' LEAGUE
c/o George W. Folkerts, Secy.
Dept. of Zoology-Entomology
Auburn University
Auburn, AL 36830

INDIANA HERPETOLOGICAL SOCIETY
c/o Garry S. Bryan
453 N. Grant St.
Martinsville, IN 46151

(No Reply)

INDIANAPOLIS ZOOLOGICAL SOCIETY REPTILE STUDY GROUP
3120 E. 30th St.
Indianapolis, IN 46218

INTERNATIONAL CROCODILIAN SOCIETY
P. O. Box 217
Silver Springs, FL 32688

IOWA HERPETOLOGICAL SOCIETY
c/o Henry Wallace
147 Tonawanda Dr.
Des Moines, IA 50312

(No Reply)

KANSAS HERPETOLOGICAL SOCIETY
c/o Mary Dawson
Topeka Zoological Park
635 Gage Blvd.
Topeka, KS 66606

George R. Pisani, Pres.
Terry D. Schwaner , Secy.
Janice Perry, Editor

Membership: 100
Publications: Newsletter

KENTUCKY HERPETOLOGICAL SOCIETY
c/o Eddie Ashmore
Box #2
2825 Lexington Road
Louisville, KY 40206

(No Reply)

LONG ISLAND NATURALIST SOCIETY
c/o F. C. Schlauch
415 Clift St.
Central Islip, LI, NY 11722

MARYLAND HERPETOLOGICAL SOCIETY
Dept. of Herpetology
Natural History Society of Maryland
2643 N. Charles St.
Baltimore, MD 21218

Herbert S. Harris, Jr., Editor

Membership: 250+
Meetings: Monthly
Publications: Leaflets, bulletin

MASSACHUSETTS HERPETOLOGICAL SOCIETY
P.O. Box 1082
Boston, MA 02103

John Rollins, Pres.
David Taylor, Editor

Membership: 250
Meetings: Monthly
Publications: Monthly newsletter, semi-annual review

MEMPHIS HERPETOLOGICAL SOCIETY
P.O. Box 11337
Memphis, TN 38111

(No Reply)

MICHIGAN SOCIETY OF HERPETOLOGISTS
c/o Horace Stafford
754 W. Shepherd St.
Charlotte, MI 48813

(No Reply)

MIDDLE MISSISSIPPI VALLEY HERPETOLOGISTS
c/o M. J. Lodato, Pres.
925 Park Plaza Dr.
Evansville, IN 47715

Membership: 4
Meetings: Irregularly
Publications: None

MISSOURI TURTLE AND TORTOISE SOCIETY
c/o Jim Selke
1340 Layven Ave.
Florissant, MO 63031

(letter returned)

THE MUHLENBERG GROUP
c/o T. J. Bloomer, Coordinator
P. O. Box #94
Augusta, NJ 07822

Membership: 42
Meetings: 3 times a year

NEVADA HERPETOLOGICAL SOCIETY
c/o Bill Cobb, Jr.
4909 Eugene Ave.
Las Vegas, NV 89108

(No Reply)

NEW MEXICO HERPETOLOGICAL SOCIETY
c/o Dept. of Biology
University of New Mexico
Albuquerque, NM 87131

(No Reply)

NEW YORK HERPETOLOGICAL SOCIETY
P. O. Box 3945
Grand Central Station
New York, NY 10017

Membership: 350
Publications: Bulletin

NEW YORK TURTLE AND TORTOISE SOCIETY
c/o Martha E. Reeves
The Dial Press
750 Third Ave.
New York, NY 10017

NORTHERN OHIO ASSOCIATION OF HERPETOLOGISTS
c/o Dept. of Biology
Case Western Reserve University
Cleveland, OH 44106

Martin J. Rosenberg, Pres.

Membership: 80
Meetings: Monthly
Publications: Monthly newsletter, irregular bulletins

OREGON INSTITUTE OF HERPETOLOGY
3675 Madrona Lane
Medford, OR 97501

(No Reply)

PACIFIC NORTHWEST HERPETOLOGICAL SOCIETY
6602 28th Ave., NW
Seattle, WA 98107

(Not Currently Active)

PHILADELPHIA HERPETOLOGICAL SOCIETY
c/o Malvin L. Skaroff, Secy.
1555 Pratt St.
Philadelphia, PA 19124

Joseph Couch, Pres.

Membership: 400
Publications: Bulletin

SACRAMENTO VALLEY HERPETOLOGICAL SOCIETY
c/o Bob Pedder
6007 Watt Ave.
North Highlands, CA 95660

SAINT LOUIS HERPETOLOGICAL SOCIETY
c/o Donald J. Coxwell, Editor
11900 San Remo
St. Louis, MO 63138

Tom R. Johnson, Pres.

Membership: 150+
Meetings: Monthly
Publications: Monthly newsletter, special issues

SAN DIEGO HERPETOLOGICAL SOCIETY

(No Address)

SAN DIEGO TURTLE AND TORTOISE CLUB
c/o Cary Herrera
7620 Eads Ave.
La Jolla, CA 92037

(No Reply)

SERPENT SAFARI HERPETOLOGICAL SOCIETY
c/o Peter Emory
RFD 2
Brewster, NY 10509

(No Reply)

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES
c/o Henri Seibert
Dept. of Zoology
Ohio University
Athens, Ohio 45701

SOUTH FLORIDA HERPETOLOGICAL SOCIETY
c/o Saul Friess, Pres.
9972 N. Kendall Dr., #54
Miami, FL 33176

SOUTHWEST FLORIDA BOIDAE RESEARCH AND BREEDING CENTER
Rt. 2 - Box 483
N. Ft. Myers, FL 33903

SOUTHWESTERN HERPETOLOGICAL SOCIETY
c/o Colin Fagan
17015 E. Glenhope Dr.
La Puente, CA 91744

TENNESSEE HERPETOLOGICAL SOCIETY

(Need Address)

TEXAS HERPETOLOGICAL SOCIETY
c/o Ann Stevens, Secy.
Rt. 1, Box 120
Wetmore, TX 78163

Wayne Seifert, Pres.

Membership: 100
Meetings: Twice a year
Publications: Newsletter twice a year

UTAH HERPETOLOGISTS'LEAGUE
c/o Mike Coffeen, Secy.
Hogle Zoological Gardens
P.O. Box 2337
Salt Lake City, UT 84110

VIRGINIA HERPETOLOGICAL SOCIETY
c/o F. J. Tobey, Jr., Editor
P.O. Box 1376
Leesburg, VA 22075

Membership: 250+
Meetings: Irregular
Publications: Bulletin, newsletter

WASHINGTON (formerly Northern Virginia) HERPETOLOGICAL SOCIETY
c/o Scott Rae
317 Adahi Rd., S.E.
Vienna, VA 21180

Elizabeth M. Lundell, Thomas Moore, Co-chairpersons

Membership: 35
Meetings: Monthly
Publications: Irregular newsletter

WEST END REPTILE CLUB
c/o Toni Siquitan
2569 Leebe Ave.
Pomona, CA 91766

(No Reply)

WISCONSIN HERPETOLOGICAL SOCIETY
800 West Wells St.
Milwaukee, WI 53233

Richard Vogt, Pres.

Membership: 70-80
Meetings: Bi-monthly
Publications: Monthly newsletter

ZOO FAUNA ASSOCIATION
c/o Dan Watson - Tom Buchanan, Editors
Abilene Zoological Gardens
P. O. Box 60
Abilene, TX 79604

Membership: 80
Meetings: Bi-monthly
Publications: Bi-monthly newsletter



"WELL, GUESS WHERE HIS SNAKE GOT AWAY TO THIS TIME!"

BOOK REVIEW

Borner, Achim-Rüdiger. 1972. Revision der Geckonidengattung Phelsuma Gray, 1825. Privately printed. 145 pp., 5 figs., 5 pls., (obtainable from the author at 5 Cologne 41, Zülpicherstr 83, West Germany. 30 DM unbound, 45 DM bound. The main thrust of this revision is the abandonment of keeled ventrals as a significant taxonomic character. Instead, Borner uses the position of the nostril thereby making it possible to recognize two subgenera: Archaeophelsuma, having the nostril above the suture between the rostral and first labial, and Neophelsuma, having the nostril above the first labial only (the genus Archaeophelsuma becomes amended to Phelsuma in the errata).

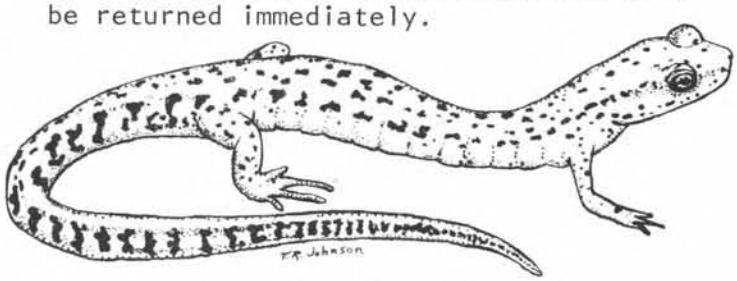
There is a key to the species and subspecies of the genus and a phylogenetic chart which is somewhat difficult to unravel; I am uncertain of the evidence upon which it is based. Thereafter follows the distribution of each taxon (23 sp. and 18 ssp.), a list of localities and Phelsuma to be found therein, plus maps showing the distribution of the various Madagascan species. A synonymy, through 1970, is provided followed by a major section devoted to the description of each form. Additionally, there is a list of suggested "standardized" German common names, a bibliography and a cross-referenced index.

I am not sufficiently familiar with the lizards to comment on the validity of the revision. Editorially, I would say that there is much repetition and that the work could have been condensed by half. What effect a private publication will have on the acceptance of two new subgeneric names and other changes in nomenclature brought about by the change in status of 11 of the taxa, I won't presume to guess. However, all Phelsuma students must become aware of this publication.

Henri C. Seibert

HERPETOLOGICAL SPEAKERS BUREAU →

In order to facilitate the process of locating speakers for herpetological societies and other organizations, a nationwide herpetological speakers bureau has been established by the SSAR. Those speakers who wish to be listed as available for this purpose should fill out the enclosed questionnaire and return immediately. Should a speaker be required, contact James Murphy and describe generally the type of program that is desired. A list of available speakers, within the area, with pertinent information as to the presentation will be returned immediately.



Long-tailed salamander

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SSAR ELECTION RESULTS

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As a result of the recent SSAR election, the following people have been elected:

MAX A. NICKERSON (Chairman-Elect)
HENRI SEIBERT (Treasurer)
STEPHEN R. EDWARDS (Secretary)
HARRY W. GREENE (Director)
RICHARD R. MONTANUCCI (Director)

The proposed amendment to provide six directors on the Board passed: 281 for; 29 against.

To facilitate the election process next year, ballots will be distributed by first class mail.

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NATIONWIDE SPEAKERS BUREAU

Please send to: James B. Murphy, Chairperson
Liaison Committee SSAR
621 E. Clarendon Drive
Dallas, Texas 75203

(Please Print or Type)

NAME _____ ADDRESS _____

CITY _____ STATE _____ ZIP _____

INSTITUTIONAL AFFILIATION, IF ANY _____

TITLE OF LECTURE _____

BRIEF DESCRIPTION OF LECTURE _____

_____

PUBLICITY MATERIAL AVAILABLE FOR DISTRIBUTION TO SPONSOR _____ AUDIENCE _____

TYPE OF AUDIENCE: (check all which are applicable) PRE-SCHOOL _____ GRADE SCHOOL _____ HIGH SCHOOL _____
COLLEGE _____ PROFESSIONAL HERPETOLOGIST _____

MINIMUM AUDIENCE REQUESTED _____ MAXIMUM _____

ARE LIVE ANIMALS USED _____ IF SO, VENOMOUS _____

WHAT PRECAUTIONS ARE TAKEN _____

LENGTH OF LECTURE _____ TIME NEEDED FOR PREPARATION BEFORE _____ AFTER _____

EQUIPMENT NEEDED: P.A. SYSTEM _____ MOVIE PROJECTOR (8mm) _____ (16mm) _____
SLIDE PROJECTOR (list type) _____ OPAQUE PROJECTOR _____
HUMAN ASSISTANCE _____ OTHER _____

AREA REQUIRED FOR LECTURE: SIZE _____ LIGHTING _____
NOT IMPORTANT _____

ARE THERE TIMES DURING YEAR WHEN UNAVAILABLE (list) _____

ANY DAY(S) OF WEEK WHICH ARE UNSUITABLE (list) _____

ANY TIME DURING DAY WHICH WOULD BE UNSUITABLE (list) _____

HOW FAR WOULD YOU BE WILLING TO TRAVEL: NOT IMPORTANT _____ 1-20 mi. _____
20-100 mi. _____ 100-500 mi. _____ 500 mi. or more _____

IS A FEE REQUIRED (if so, list amount) _____ ROOM AND BOARD _____ TRAVEL _____

ADDITIONAL INFORMATION OR COMMENTS _____

_____

_____

THE SIGMA XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1974-75 AND 1975-76 IN "HERPETOLOGY"

Awards for 1974-75

TERRY L. CHESTER, Yale University. The feeding preferences of the western toad (Bufo boreas). $150.

JAMES C. GILLINGHAM, University of Oklahoma. Comparative reproductive behavior in the North American rat snakes, genus Elaphe. $75.

DON L. MOLL, Illinois State University Reproductive biology, isolating mechanisms, and ecological partitioning in sympatric Isle Royale anurans. $100.

JEANNE A. MORTIMER, University of Florida. Aspects of the nutrition of the Caribbean green sea turtle, Chelonia mydas. $100.

STEPHEN R. PARCHER, Bakersfield, California. Behavior and ecology of Malagasy Chamaelecntidae. $99.

ROBERT M. PRICE, New York University. Systematics of Lampropeltis calligaster. $100.

CAROL A. SIMON, American Museum of Natural History, New York. Feeding strategies for the iguanid lizard Sceloporus jarrovi. $150.

JAMES E. STANCHFIELD, Dartmouth College. The role of nonhistone chromosomal proteins in anuran amphibian development. $150.

JAMES R. STEWART, University of California, Berkeley. Interpopulational variation in the demography of a live-bearing lizard, Gerrhonotus coeruleus. $200.

KRISTINE TOLLESTRUP, University of California, Berkeley. A comparative study of the reproductive ecology of two species of leopard lizards, Crotaphytus silus and Crotaphytus wislizenii. $150.

C. RICHARD TRACY, Colorado State University. Field verification of mechanistic models of the water and energy dynamics of terrestrial amphibians. $100.

Awards for 1975-76

JOSEPH J. BEATTY, Oregon State University. Geographic variation in life history and systematics of the clouded salamander, Aneides ferreus (Cope). $100.

WILLIAM M. CHILIAN, Texas Tech University. Some physiological parameters of Kinosternon flavescens. $100.

NEIL B. FORD, University of Oklahoma. The role of pheromones in sexual activity of four species of garter snakes (Thamnophis). $100.

ALISON G. LaVOY, Smith College. The rates of development of three populations of Rana sylvatica: Are they primarily environmentally or genetically controlled? $60.

PAUL L. LEVIN, University of Texas at Austin. Feeding ecology of the lizard Holbrookia propinqua: An investigation of foraging strategy in spatially and temporally varied environments. $50.

GEORGE A. MIDDENDORF III. American Museum of Natural History. Thermal aspects of temporal partitioning by the lizard Sceloporus jarrovi. $100.

CECIL R. SCHWALBE, University of Arizona. The effects of low temperatures on neuromuscular transmission and myosin ATP-ase activity in desert and montane lizards (Sceloporus magister and S. jarrovi). $100.

ROBERT A. THOMAS, Texas A&M University. Investigations of selected neotropical snake genera. $150.

SUSAN L. WINDROW, Rutgers University. Social behavior and ecology of the Bahamian iguana (Cyclura figginsi). $150.

H. PATRICK WOOLLEY, Kansas State University. A study in mimicry of three salamander species. $150.

Herpetological Skeletons, Skulls & Skins. Send for Illustrated pricelist to HERP OSTEO-SPECIMENS, 11324 Ventura Blvd., No. Hollywood, CA 91604

NEW LEASE OF LIFE FOR DARWIN'S GIANT TORTOISES

Morges, Switzerland - Giant Galapagos island tortoises raised under protection from predators which have prevented them reproducing successfully for many years, are now being reintroduced and are thriving in their natural homes, according to a report received by the World Wildlife Fund.

The tortoises, which differ in form from island to island, are among the Galapagos animals which provided Charles Darwin with living evidence of evolution. Goats, pigs, rats, dogs, cats, donkeys and cattle introduced by man have threatened their survival by destroying eggs and young and competing for available food supplies. No young of some subspecies had grown to maturity for over 60 years.

The Charles Darwin Research Station which has international support, has been protecting tortoise nests by building rock walls around them or putting wire netting over the eggs. The eggs are removed when about to hatch and the young are raised at the Station.

The former Director of the Station, Dr. Peter Kramer, states: "Repatriation of young Pinzon tortoises started in December 1970. So far 80 young, which had been kept for four or five years at the Station, have been repatriated to Pinzon. They were observed at regular intervals and were found to be in very good condition."

Eight subspecies of tortoise from various islands are being raised at the Darwin Station. During the searches for breeding areas on the islands scientists found a few survivors of the Pinta subspecies which was believed extinct, and it is hoped to build up a protected breeding stock.

Some tortoises are still killed by the crews of fishing vessels from the South American continent, and there is evidence that small tortoises are being taken illegally for sale to animal dealers.

Apart from the breeding programme, the Darwin Station, in association with the authorities of Ecuador, which has sovereignty over the Galapagos islands, is controlling and eliminating introduced predators where possible. Goats have been totally eliminated on Santa Fe and Rabida, and reduced elsewhere. Pigs are being kept to minimum numbers. But no effective method of dealing with dogs and cats, which are threatening sea lions, and land and marine iguanas, as well as tortoises, has yet been found.

WORLD WILDLIFE FUND

PHILODRYAS OLFERSI (LICHENSTEIN) NEW TO COLOMBIA AND VENEZUELA

The range of Philodryas olfersi (Lichenstein) as presently understood extends latitudinally from northern Argentina to north of the Amazonian Basin in Brazil, Surinam, and French Guiana, and longitudinally from the eastern slope of Peru east to the Atlantic coast (Fig. 1, hatched area). The northernmost reported locality is Charlottenburg, Surinam (Brongersma, 1957). An examination of museum material of this genus from northern South America reveals the existence of P. olfersi in Colombia and Venezuela.

Recent compendia of the snakes of Colombia (Niceforo Maria, 1942; Gunn, 1944; Daniel, 1949, 1955; Medem, 1968) reported viridissimus (Linnaeus) as the only Philodryas known from that country. A series of that genus (UTA-R 3543-44, 3547, 3552, 3655) arising from field work coordinated by W. F. Pyburn in the vicinity of Lomalinda (ca. 10 km N Puerta Lleras), Estado Meta, represent the first reported specimens of P. olfersi from Colombia and the first verified from the Llanos region.

Roze (1966, 1970) listed two species of Philodryas from Venezuela: carbonelli Roze and viridissimus. Specimens of P. olfersi examined by us are from several closely approximated localities in the tropical rainforest region of the Alto Rio Ventuari, Territorio Federal Amazonas (MCN 786, 852, 944, 1863, 4037) and from Mata de Cuchillo (between Sta. Elena de Uairen and Paurai-Tepui), Estado Bolivar, situated in the Gran Sabana area (MCN 5017). Another specimen (ZIMH 3708 bears the label "Laguayra, Venezuela", which may refer to the port city of La Guaira (an unlikely locality for olfersi since it is north of the Cordillera de La Costa) or Cerro La Guayra in western Estado Bolivar. If the data refers to the former locality, it would undoubtedly indicate the point of dispatch. The latter locality is situated near the Rio Orinoco in the Llanos and could be the collection site. It is surprising that the presence of this species in Venezuela has been overlooked since the MCN specimens were collected in 1960 and the ZIMH specimen prior to that time.

The specimens reported above agree well in meristic and mensural characteristics with over 400 specimens of P. olfersi which we have examined from other parts of the range.

We wish to thank H. W. Greene, University of Tennessee; W. Ladiges, Zoologisches Staatsinstitut Zoologisches Museum, Hamburg (ZIMH); A. R. Lancini V., Museo de Ciencias Naturales, Caracas (MCN); and W. F. Pyburn and J. L. Darling, University of Texas at Arlington (UTA-R) for the loan of specimens and other information.

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Fig. 1. The range of Philodryas olfersi (Lichenstein)

Niceforo Maria, H. 1942. Los ofidios de Colombia. Ann. Rev. Acad. Colombiana Cien. 5: 84-101.

Roze, J. A. 1966. La taxonomia y zoogeografia de los ofidios en Venezuela. Univ. Central Venezuela, Caracas.

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Robert A. Thomas and James R. Dixon
Department of Wildlife and Fisheries Sciences
Texas A&M University
College Station, Texas 77843 USA

BOOK REVIEW

Deuchar, Elizabeth. 1975. Xenopus: the South African clawed frog. John Wiley and Sons, New York. $29.50. X + 246 pp.

In many laboratories Xenopus has replaced Rana as an experimental animal, and a textbook on its anatomy and physiology has become a necessity. The present volume fills this need and will help make Xenopus as well known to the general biologist as Rana, Necturus, or Salamandra.

The first chapter describes the species of Xenopus and their natural habitat. This is one of the shorter and weaker chapters in the book and it is obvious that the author is not on "intimate" terms with systematics or ecology. The second chapter is devoted to anatomy, with emphasis on special features as contrasted to other amphibia. Chapter three is entitled "Physiological studies on Xenopus". However, most research has been on reproductive physiology, principally because of interest generated by its ready response to injections of gonad-stimulating hormones. The next seven chapters deal with gametogenesis, fertilization, embryogenesis, cleavage, gastrulation, organogenesis and with examples of precision work on the control of later events in development, regeneration, immunogenesis, etc.

There is an index and an extensive bibliography, brought up to date (1974) even while the manuscript was in proof. The book is profusely illustrated. Its greatest value will be to the embryologist or experimental morphologist with lesser import to the ecologist and systematist.

-- Henri. C. Seibert, Dept. of Zoology, University of Ohio, Athens, Ohio.

NEW PUBLICATIONS

Common New Guinea Frogs, written by J. I. Menzies, is available from Wau Ecology Institute, Box 77, Wau, Papua, New Guinea or Bishop Museum Press, Box 6037, Honolulu, Hawaii, 96818.

* * * * * * * * * * * * * * * * *

A Check-List of West Indian Amphibians and Reptiles, written by Albert Schwartz and Richard Thomas, is available from the Section of Amphibians & Reptiles, Carnegie Museum of Natural History, Pittsburgh, PA 15213.

* * * * * * * * * * * * * * * * *

Amphibien und Reptilien Europas, written by Ludwig Trutnaw, is available from Hippocrene Books, New York.

Miguel Alvarez del Toro's "Los Crocodylia de Mexico (Estudio Comparativo)" published in 1974, is available for $7.50 from Dr. Enrique Beltran, Director, Instituto Mexicano de Recursos Naturales Renovables, Dr. Vertiz 724, Mexico 12, D.F., Mexico. 70 pages, quarto, profusely illustrated. Reviewed by Hobart M. Smith in Copeia, 1975, page 189.

Reptiles & Amphibians of Australia, written by Harold Cogger, is available from Reeds, 53 Myoora Road, Terrey Hills, NSW 2084, Australia

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KANSAS DISCOUNTS PUBLICATION

The Hylid Frogs of Middle America, written by W.E. Duellman and illustrated by D.M. Dennis is being discounted 40% for a limited time. Contact: Publication Secretary, Museum of Natural History, Univ. of Kansas, Lawrence, KS 66045.

HERPETOLOGICAL "LIFE LIST"

Somewhere in the near future the SSAR will be publishing a checklist of US herpetofauna with both common and scientific names. I would like to suggest to those who are interested that this list be used for a "life list" with judge). If you observe a living example of a particular species in the wild and make no effort to collect it (it is OK to move it a bit for a photograph or positive identification) then you may check that species in the page margin. The key idea is you make no effort to remove it from its wild state. Animals you collect, attempt to collect or see in captivity do not count.

John S. Applegarth
P.O. Box 91
Durango, CO 81301

AUSTRALIAN FROG CALLS AVAILABLE

The calls of 44 of the 75 recognized forms of frogs inhabiting S. E. Queensland, N.S.W., Victoria, Tasmania and S. E. South Australia have been recorded on casette and reel-reel tapes. The one-hour recordings include an introduction and general commentary. The calls are grouped by geographic regions. Contact: Gordon Grigg and John Barker, Zoology Dept., Univ. of Sydney, Sydney, N.S.W. 2006, Australia.

EASTERN SEABOARD HERPETOLOGICAL LEAGUE MEETING

The next ESHL meeting will be held 6 March 1976 at the Rohm & Haas Bld. Auditorium at Independence Square West in Philadelphia.

A NEW METHOD FOR TRAPPING SOFTSHELL TURTLES

We have found that the usual methods for trapping softshell turtles (Trionyx sp.) are often unreliable and inefficient. Breckenridge (1955) reported the best results with hoop nets, but his drop net was unsuccessful.

We constructed a rectangular net (5 m x 2 m) from No. 24 nylon cord (Fig. 1). A pore diameter of 6-8 cm allowed the net to be pulled rapidly out of the water. One long side of the net was staked to the bank at 15 cm intervals and about 30 cm above the water. Plastic rings (ca. 5 cm diameter) and weights were attached to each end and the center of the opposite side which sank in the water. Steel rods (4 m x 1-3 cm), inclined toward the bank at about a 45° angle, extended through the rings and into the river bottom. Lines extending from the plastic rings through similar guide rings at the top of the rods were joined to a common pull cord that extended to a blind.

While turtles were basking on the bank, the main cord was pulled enough to raise the submerged edge of the net about 0.5 m out of the water and form a U-shaped net. At the first sign of net movement, the turtles ran into the water and swam downward into the net. It was then pulled to the bank and turtles were untangled from the net by hand.

The turtles showed no fear of the net although it often took them some time to make their exit from the water. They did not attempt to avoid the net during their escape rush, and individuals returned the following day. Occasionally, smaller turtles escaped through the net. This method should be equally successful with other species that bask on land.

KEITH M. ROBINSON and GEORGE G. MURPHY
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Murfreesboro, Tennessee 37130

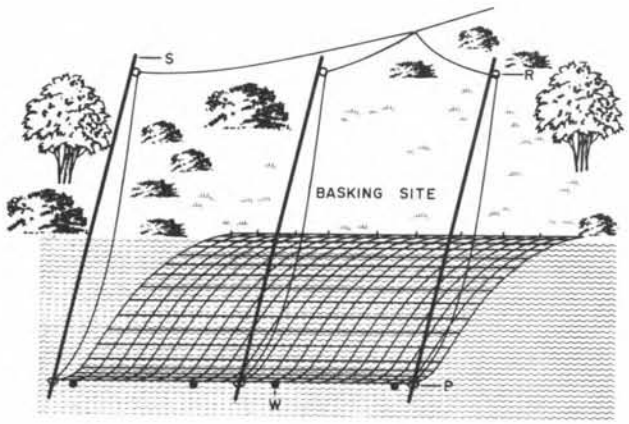


Fig. 1. Trapping softshell turtles.

THE THEODORE ROOSEVELT MEMORIAL FUND

The Theodore Roosevelt Memorial Fund provides financial assistance to individuals (especially graduate students and persons with recent graduate degrees) conducting research in North America in any phase of wildlife conservation or natural history related to the activities of the American Museum of Natural History. Grants are usually kept to small sums of not more than several hundred dollars. Most awards support field work, and funds are not made available for salaries or for the purchase of non-expendable equipment. Address requests for application forms and all correspondence to:

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Deadline for application is 15 February.

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

McIlhenny's
The Alligator's Life History

125 pages, 18 full-page photographs, portrait, originally published Boston, 1935

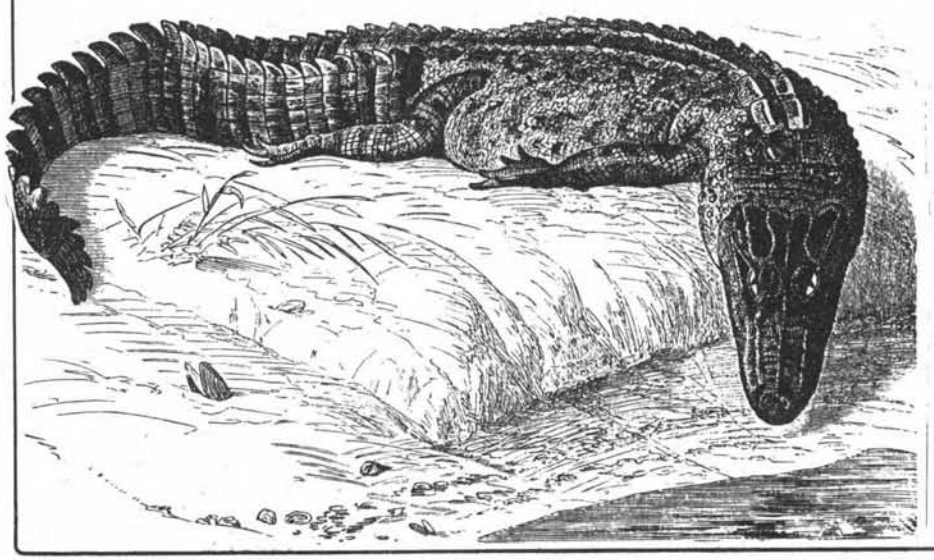
WITH A NEW PREFACE BY ARCHIE CARR (University of Florida)

Although published forty years ago, this classic is still the most complete record of the natural history of North America's most distinctive reptile. The book is based on personal observations made over a lifetime of intimate association with the alligator in its native habitat. There are chapters on facts and myths, habitat, dens and hibernation, food and growth, voice, nest building and incubation, and enemies. In view of the endangered status of crocodilians internationally and their important phylogenetic position, McIlhenny's account will continue to provide a wealth of basic information for evolutionary, behavioral and ecological studies.

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Orders may be placed now. The book will be published in Spring 1976; to take advantage of special prices, *SSAR members must place their orders before publication.* Please mark the edition you desire and send with payment to Dr. Henri C. Seibert, Morton Hall, Ohio University, Athens, Ohio 45701, USA. Make checks payable to "SSAR"; receipt sent on request only.

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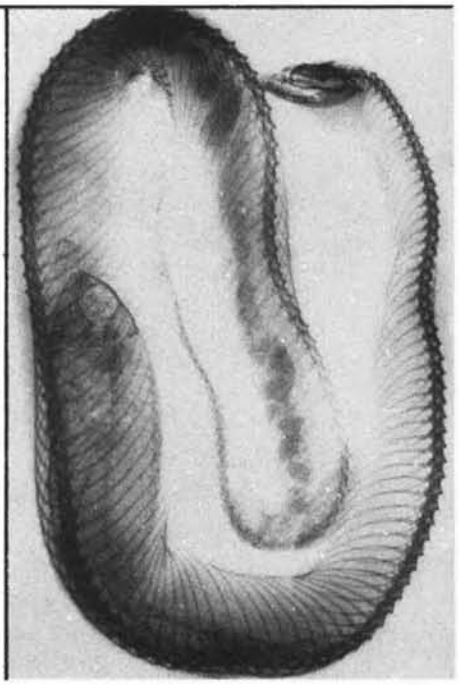
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THE BIOLOGY OF SEA SNAKES





Edited by
William A. Dunson, Ph.D.,

Professor of Biology,
The Pennsylvania State University

This richly detailed, extensively documented volume reflects the importance now being given to scientific studies of the sea and the special attention being given to sea snakes — the most successful living group of marine reptiles, in spite of their rigorous, hard-to-colonize habitat.

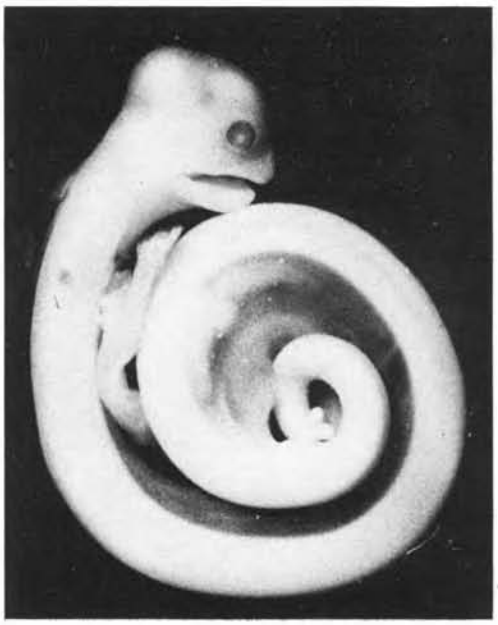
In addition to providing the most extensive, thorough review ever published on the general biological aspects of sea snakes, this book includes a wealth of data and knowledge obtained from two unique expeditions involving an international group of scientists carrying out detailed experimental studies on sea snakes. The expeditions were organized by Dr. Dunson, joined by ten of the other contributors to this volume.

THE BIOLOGY OF SEA SNAKES emphasizes the unusual features of sea snake adaptation — their tropical distribution, their venomous nature and the protection this gives them from predators, their feeding behavior and diving physiology, and their ability to regulate body fluid salt content. An entire chapter is devoted to the life history of a specialized barnacle found only on the skin of sea snakes.

The book also covers the evolution and taxonomy of the Australian species, together with such controversial topics as attacks on divers and possible migration through the proposed Atlantic to Pacific sea level canal. Other subjects include the epidemiology and clinical aspects of sea snake bites and a description of the unique Philippine commercial sea snake fisheries.

Except for the almost wholly taxonomic 40-year old classic, *Monograph of the Sea-Snakes* by Malcolm Smith, this is the only book on sea snakes published in this century. It is an essential reference for all marine biologists, biological oceanographers, and herpetologists, including advanced undergraduate and graduate students. In addition, it provides fascinating reading for all scientists and everyone interested in ecology, natural history, and the environment.

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GALAPAGOS TORTOISE HATCHES AT PHILADELPHIA ZOO

On 20 September 1975 at the Philadelphia Zoo, a Galapagos tortoise (Geochelone elephantopus) began to hatch after an incubation period of 200 days at a temperature of 26.7°C. After unsuccessful attempts to break through the shell, the hatchling was removed from the egg on 23 September. The hatchling weighed 77.6 g., and the straight-line carapace length was 67.6 mm.

The last observed copulation between the parents occurred on 8 January, 1975 at 0715 hours, and a clutch of nine eggs were laid in an excavated sand nest on 5 March at 0900 hours. Four eggs were broken in the nest. Of the five eggs placed in the incubator, three proved to be fertile. One fertile egg, which was opened on 25 July, contained a live embryo. The third egg was opened on 1 October, and it contained an embryo, which had been dead for approximately four weeks.

The male parent came to Philadelphia in 1946 as a gift from the New York Zoological Society. It was from one of the herds of Galapagos tortoises which were maintained by that Society in southern Florida. This male is one of the specimens collected by Dr. Charles H. Townsend (NYZS) on southern Albemarle (Isabela) in 1928.

The female parent is a captive bred tortoise which hatched at the Bermuda Government Aquarium and Museum in 1940. It is interesting to note that this female is an offspring of stock collected on that same Townsend Expedition. For these reasons the hatchling is probably representative of the nominate race Geochelone elephantopus elephantopus.

J. Kevin Bowler
Curator of Reptiles

CONSERVATION NEWS

Two national parks are being planned by the government of Peru. They will cover an area of about 3800 square miles in the Amazon Basin.

UPI in the Milwaukee Journal

Costa Rica has declared 72,000 acres a national biological preserve. The site is on the Osa Peninsula, 90 miles south of San Jose, Costa Rica's capital. Scientists have observed 42 species of frogs and 19 of lizards in the area.

NY Times

"The California Fish and Game Commission has placed tight restrictions on commercial trade in the state's amphibians and reptiles.....The use of frogs is already regulated.

"The new regulations prohibit the taking, transporting, exporting, importing and sale for commercial purposes of most native reptiles and amphibians."

OUTDOOR CALIFORNIA
September-October 1975

National Audubon workers are transplanting 1000 American alligators from Louisiana to parts of its range where it has been eliminated. The National Audubon Society suggested this practice rather than allowing the surplus alligators to be hunted for their hides.

Audubon Magazine
Sept. 1975

In June, Ricky Chambliss and Donnie Davis killed a 10 ft. alligator near Eagletown, Oklahoma. For their efforts they each received a fine of $115 and a suspended 30 day jail sentence.

GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW publishes brief notices of new geographical records in order to make them available to workers in published form. The STANDARD FORMAT for a record is:

SCIENTIFIC NAME (Common name). Locality (air-line distance to nearest town); date; collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY. address.

Please submit new records in STANDARD FORMAT (short manuscripts are acceptable when data cannot be adequately presented in standard format) to Joseph C. Mitchell, Dept. of Zoology, Arizona State University, Tempe, Arizona 85281.

Recommended citation: Jones, J. 1974. Geographic Distribution: Rana pipiens. Herp. Rev. 5(1):1.

CAUDATA

AMBYSTOMA ANNULATUM (Ringed salamander). U.S.A., Arkansas, Sharp Co., 3.8 km SW Ash Flat; 3 May 1975; B. Richards. V. Rick McDaniel. Arkansas State University Zoological Collection, ASU 1678. Eastward extension of known range from western Arkansas into northern portion of East-central Arkansas (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co.). Submitted by V. RICK McDANIEL, Division of Biological Sciences, Arkansas State University, State University, ARK 72467.

AMBYSTOMA TEXANUM (Small-mouthed salamander). U.S.A., Oklahoma, Garfield Co., 10.3 km SE Covington; 5 Aug. 1972; 14.3 km SE Covington; 20 Jan. 1975; Vance AFB Military Housing Area, 3.5 km SW Enid; 26 Oct. 1974; R. L. Lardie. Collection of R. L. Lardie, RLL 772, 1325, 1251, respectively. Extends range 40, 41 and 71 km NW of nearest Oklahoma records in Payne Co. (Oklahoma State University A 921, 922) and represents first county records. Submitted by RICHARD L. LARDIE and BRYAN P. GLASS, Dept. of Biological Sciences, Oklahoma State University, Stillwater, OK 74074.

SALIENTIA

BUFO BUFO (Common toad). IRAN, Mazandaran Province, 20 km SSE Sari; 21 May 1975; R. G. Tuck, Jr. R. G. Tuck, Jr. and S. C. Anderson. Muze'-ye Melli-ye Tarikh-e Tabi'i, Tehran, Iran, MMTT 745-746. First records for province and first adult specimens known from Iran. Previously known in Iran only from 2 juveniles taken 10 km W Ramsar, Gilan Province (Eiselt, J., 1973, Ann. Naturhistor. Mus. Wein, 77:181-243). Submitted by ROBERT G. TUCK, JR., Curator/Advisor, MMTT, Dept. of the Environment, P.O. Box 1430, Tehran, IRAN.

HYLA CRUCIFER CRUCIFER (Northern spring peeper). U.S.A., Michigan, 23.5 km NE Seney, Luce Co., T 47 N, R 12 W, Sec. 17, NE 1/4, NE 1/4, 4 May 1975; R. L. Eckloff and M. B. McCune. J. K. Werner. Northern Michigan Univ. Mus. Zool., NMZ 86.1 - .8. First record for county. Keweenaw Co., 15.7 km NW Gay, T 56 N R 31 W, Sec.6, NE 1/4, NE 1/4; 8 May 1975; M. B. McCune. J. K. Werner. NMZ 84.1 - .10. First record for county. H. crucifer is now recorded from all Upper Peninsula, Michigan counties. Submitted by M. B. McCUNE and R. L. ECKLOFF, Dept. of Biology, Northern Michigan University, Marquette, MI 49885.

TESTUDINES

CHELYDRA SERPENTINA (Snapping turtle). U.S.A., New Mexico, Mora-Harding Co. boundry; 15.2 km WSW Roy; 25 June 1975; M. E. Seidel. University of New Mexico, Museum of Southwestern Biology, UNM 30513. New county record and extension of range 69 km NW in the Canadian River

(Degenhardt and Christiansen, 1974, SW Nat., 19(1):21-46. Submitted by MICHAEL E. SEIDEL, Dept. of Biological Sciences, Marshall University, Huntington, W. VA 25701.

CHRYSEMYS FLORIDANA HOYI (Missouri slider). U.S.A., Oklahoma. Garfield Co., 3.2 km SW Enid; 6 Aug. 1975; C. Hammond and E. Lusky. Collection of R. L. Lardie, alive. Extends range 79 km W of nearest Oklahoma record and first county record (Webb, 1970, Reptiles of Oklahoma, University Oklahoma Press). Submitted by RICHARD L. LARDIE, Dept. of Biological Sciences, Oklahoma State University, Stillwater, OK 74074.

CHRYSEMYS SCRIPTA ELEGANS (Red-eared turtle). U.S.A., New Mexico, San Miguel Co., Canadian River, 0.5 km WNW Sabinoso; 4 July 1975; M. E. Seidel. University of New Mexico, Museum of Southwestern Biology, UNM 30514. Extension of range 39.1 km NW of previous NW range limit (Degenhardt and Christiansen, 1974, SW Nat., 19(1):21-46). Submitted by MICHAEL E. SEIDEL.

SAURIA

HEMIDACTYLUS MABOUIA (African wall gecko). BRITISH WEST INDIES, Grand Turk Island near airport: South Caicos Island, Cockburn Harbour; 21-23 June 1975; M. R. Minton and S. A. Minton. Collection of S. A. Minton, SAM 1409 and 3 live specimens. First records for species from Turks and Caicos Islands. Submitted by MADGE R. MINTON and SHERMAN A. MINTON, Indiana University Medical Center, Indianapolis, IND 46202.

SERPENTES

CONIOPHANES FRANGIVIRGATUS (Peter's black-striped snake). MEXICO, San Luis Potosi, 20 km N Ciudad Valles; 19 Dec. 1974; M. R. Minton and S. A. Minton. Collection of S. A. Minton, SAM 1393. First record for state of San Luis Potosi; third for species. Submitted by BROOKS MINTON DE CERVANTES, Angela Peralta 20, Queretaro, Qro., Mexico and SHERMAN A. MINTON, Indiana University Medical Center, Indianapolis, IN 46202.

MICRURUS FULVIUS MICROGALBINEUS (Tamaulipan coral snake). MEXICO, Queretaro, Cimatario, 4 km S Queretaro, elevation about 2000 m.; Sept. 1974; collector unknown. Collection of S. A. Minton, SAM 1390. First record for plateau region of Queretaro and probable altitude record for the species. Submitted by BROOKS MINTON DE CERVANTES and SHERMAN A. MINTON.

STORERIA DEKAYI LIMNETES (Marsh brown snake). U.S.A., Texas, Webb Co., Laredo; 16 July 1975; B. M. Burr. M. A. Morris. Illinois Natural History Survey, INHS 10206. County record and southwestern range extension along Rio Grande (Raun and Gehlback, 1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist.). Submitted by BROOKS M. BURR and MICHAEL A. MORRIS, Illinois Natural History Survey, Urbana, ILL 61801.

THAMNOPHIS SIRTALIS ANNECTENS (Texas garter snake). U.S.A., Oklahoma, Ellis Co., tributary of Wolf Creek, 2.5 km N Fargo; 28 June 1975; R. L. Lardie. Collection of R. L. Lardie, alive. Establishes presence in Oklahoma. Disjunct populations are known in the Texas Panhandle and Meade Co., Kansas (Fitch and Maslin, 1961, Univ. Kansas Publ. Mus. Nat. Hist., 13(5):289-308). See also Conant (1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co.). This specimen represents an extension of 78 km eastward of the Texas Panhandle population. Submitted by RICHARD L. LARDIE.

THAMNOPHIS SIRTALIS PARIETALIS (Red-sided garter snake). U.S.A., Arkansas, Lawrence Co., Imboden; April 1975; F. E. Campbell. V. R. McDaniel. Arkansas State University Zoological Collection, ASU 1679. Eastward extension of known range from Southwest Missouri to northern portion of East Arkansas (Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin Co.). Submitted by V. RICK McDANIEL and WILLIAM W. BYRD, Division of Biological Sciences, Arkansas State University, State University, ARK 72467.

TYPHLOPS BRAMINUS (Brahminy blind snake). MEXICO, Queretaro, Queretaro; July 1971 and November 1972; Brooks Minton De Cervantes. Collection of S. A. Minton SAM 1185 and 1240, respectively. First record for Mexican plateau. Submitted by BROOKS MINTON DE CERVANTES and SHERMAN A. MINTON.

RECORD SIZE PHRYNOSOMA DOUGLASSI

Phrynosoma douglassi. Conant (1975, A Field Guide to Reptiles and Amphibians of Central and Eastern North America, Houghton Mifflin Co.) records a record size P. douglassi hernandesi having a SV length of 109 mm and total length of 149 mm. Kerfoot (1962, Southwest Nat. 7:78-79) reported a giant specimen of P. douglassi ornatissimum from Colorado having the following measurements: SV, 104 mm; tail, 45 mm and width at mid-body, 62 mm. On 26 May 1975 I collected a female P. douglassi hernandesi on the western slope of the Dos Cabezas Mountains, Cochise Co., Arizona measuring 112 mm SV, 47 mm tail, 70 mm width at mid-body and 159 mm total. It was a mixed rocky and sandy area dominated by Prosopis - Opuntia - Acacia vegetation. This individual contained 33 oviducal eggs, three more than recorded by Fitch (1970, Univ. Kansas Mus. Nat. Hist., Misc. Publ. 52: 1-247) but less than the 48 maximum reported by Howard (1974, J. Arizona Acad. Sci. 9:108-116). The specimen is deposited in the author's collection (JCM 330). I thank M. J. Fouquette, Jr. and S. R. Wylie for criticizing this note.

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Arizona State University
Tempe, AZ 85281

AN ENCLOSURE DESIGN FOR STUDYING TERRESTRIAL SALAMANDERS

During an ecological study of salamanders a necessary modification of Jaeger's (1971) enclosure method was developed. Six enclosures were built of aluminum screen (1 mm mesh). The top was left open to permit natural litter deposition and the upper edge of the screen was folded inward in an inverse U-shape to prevent the salamanders from escaping. Individuals of Plethodon cinereus were placed in the enclosures in early May and checked five days later. In the interim other P. cinereus as well as a Gyrinophilus porphyriticus had entered the enclosures. The Gyrinophilus had apparently depredated the original stock of animals since no P. cinereus remained in the enclosure it entered.

While the design adequately prevents egress by the study animals, it does not prevent ingress of salamanders. To rectify this, strips of screen folded outward were affixed to the sides so that each side formed an upsilon (ϒ) as seen in edge view. This addition to the original design successfully prevented salamanders from entering the enclosures.

Literature Cited

Jaeger, R. G. 1971. Competitive exclusion as a factor influencing the distributions of two species of terrestrial salamanders. Ecology. 52:632-637.

FRED LOTTER

Biological Sciences Group
University of Connecticut
Storrs, Connecticut 06268

Present address:

National Fish and Wildlife Lab
Museum of Southwestern Biology
University of New Mexico
Albuquerque, New Mexico 87131

CURRENT LITERATURE

NOTICE: The Current Literature project is now being handled by the Milwaukee Public Museum. All searchers: Please note the change in address.

As of July 1974, 59 searchers are scanning a total of 408 journals.

Searchers: As the titles will be published 4 times per year, try to send your titles in at least 4 times a year to have an approximately equal listing each issue in HR.

Due to lack of space in this issue, an updated list of journals is not included. Such an updated list is scheduled for next issue, budget permitting.

Any questions, comments, etc. should be sent to:

Max A. Nickerson
Current Literature
Vertebrate Division
Milwaukee Public Museum
Milwaukee, Wisconsin 53233

A

ANDREWS, ROBIN and A. S. RAND
1974. Reproductive effort in anoline lizards.
ECOLOGY 55(6):1317-1327.

ANGELIER, N. and J. C. LACROIX
1975. Complexes de transcription d'origines nucleolaire et chromosomique d'ovocytes de Pleurodeles waltlii et P. poireti (Amphibiens, Urodeles).
CHROMOSOMA 51(4):323-335.

ANON
1973. Two new records of Chinese colubrids from southern Yunnan -- Natrix nigrocincta and Plagiopholis blakewayi.
ACTA ZOOL SINICA 19:306.

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Death Feigning by the Western Coachwhip Snake

Escape behavior of the western coachwhip (Masticophis flagellum testaceus) is often characterized by speedy retreat from the immediate vicinity or to the nearest cover (e.g., hole, vegetation, or boulders). Therefore recognition of death feigning was surprising and out of character with normally observed behavior and temperament. Death feigning by Masticophis flagellum was observed in six of 41 (15%) from McLennon County, Texas and reported from southern Oklahoma and eastern Texas by Gehlbach (1970). The behavior has not been observed in western coachwhips from Trans-Pecos Texas or New Mexico. Near Alpine, Texas, during the summers of 1968 and 1969, death feigning was exhibited by two of 11 (18%) non-juvenile western coachwhips examined. None of 13 coachwhips less than 350 mm snout-vent (s-v) death-feigned.

On 25 August 1968 a male (1157 mm s-v) was observed backing outstretched on the ground. Its appearance was unusual due to a highly exaggerated undulatory aspect to its configuration. Upon approach it struck and attempted to escape. I grasped the snake at midbody, and after some writhing it exuded copious amounts of saliva and/or water. Next, the posterior portion of body went limp and about 200 mm of the head and neck stiffened. The head was cocked in a ventrad position due to a high arch in the cervical area. The quadrate bones and mandibles were spread laterally, and when placed on the ground the rostral was pushed into the soil. This position was held for several minutes during which the snake was prodded and moved numerous times. The only response was that the head was laid down sideways, but still in the cocked and spread position. Feigning was continued as the specimen was placed in the collecting sack.

On 28 July 1969 a male (1150 mm s-v) that had been held in a bag for several hours death-feigned (Fig. 1). When taken out it thrashed wildly and performed similarly to the first snake. The major difference was that the arch in the cervical area was not as pronounced as with the earlier specimen.

In contrast to other observations of Masticophis flagellum (Gehlbach, 1970) and of Natrix natrix (Heusser and Schlumpf, 1962), the occurrence of death feigning in both of these specimens was associated with low ambient temperatures. The first snake was captured after a thunder shower (air 23° C), and the second individual had been in an air conditioned room prior to handling.

Gratitude is extended to Dr. James L. Vial and Harry W. Greene for critically reviewing the manuscript.

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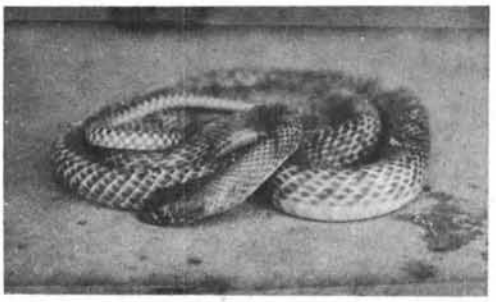


Figure 1.--Masticophis flagellum testaceus feigning death.

NOTES ON THE EGG LAYING HABITS OF *DEIROCHELYS RETICULARIA*

Deirochelys reticularia. On 11 May 1973 ca. 16 km E College Station, Brazos County, Texas, a chicken turtle (*Deirochelys reticularia*) was encountered as it completed nest building procedures. The nest was "goblet"-shaped, 16.5 cm deep and 30m from the edge of the flooded Navasota River. The nest was constructed in sandy soil on a slope, of about 15°, in low weeds and grasses. No trees or brush were within 50m of the nest site, which was noticeably wetter than the surrounding ground.

According to Gibbons (Copeia, 1969: 669-676), clutch size in *D. reticularia* is 5-7 eggs with reproductive senility becoming evident in turtles over 180 mm in length. In the present instance the clutch consisted of 8 eggs laid during a 20 min. period by a female 209.5 mm in length. Eggs were laid at approximately two min. intervals. The range of diameters was from 1.7-2.3 cm and the lengths ranged from 2.8-3.2 cm. The eggs were oblong, leathery, and almost pink when laid. They became white and firm after exposure to the air.

After the eighth egg was laid, ca. 5 min. passed before the turtle began to fill in the nest with dirt and debris. She remained in the egg-laying position, using semicircular sweeping movements of her hind legs to fil the nest. This required just over 15 min.

The nest was marked and checked at least once every two weeks. After eight weeks the nest was excavated. The shrunken, dried eggs contained yellow dried yolk, but no embryos.

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IN THE NEWS

An 11-year-old boy displayed symptoms of a venomous snakebite after a 31-inch garter snake bit and held on to the boy's hand for 10 minutes. Symptoms included swelling up to the shoulder and discoloration

Los Angeles Times
18 November 1975

The Florida State Museum, Univ. of Florida is hosting the first all Florida Herpetology Conference on Saturday, 17 January 1975 at the FSM. The program will include keynote presentations on the Komodo Dragon, by Walter Auffenburg, and the ecology of *Hyla andersoni*, by R. Bruce Means. Additionally, there will be a photo workshop, discussions of herpetological problems and a request for records, photos, etc. for the Amphibians & Reptiles of Florida project being undertaken by Ray Ashton and Dick Franz.

HERPETOLOGY LOSES PROMINENT CONTRIBUTORS

We have received notices of the deaths of Drs. A. Hughes, Robert Mertens, T. Preston Webster and V. F. M. Fitzsimons. Obituaries will be published in Herp. Review, Volume 7.

WANTED

A position as an illustrator, museum artist or graphics designer. Currently an instructor in biology at Washburn University. Contact Ms. Mary Makepeace, 1320 Valley Land, Lawrence, Kansas.

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****

ERRATUM: Herpetological Circular, No.4, page 4, section 11. A., line #2 of 'Treatment'-- change 40 mg to 0.4 mg.

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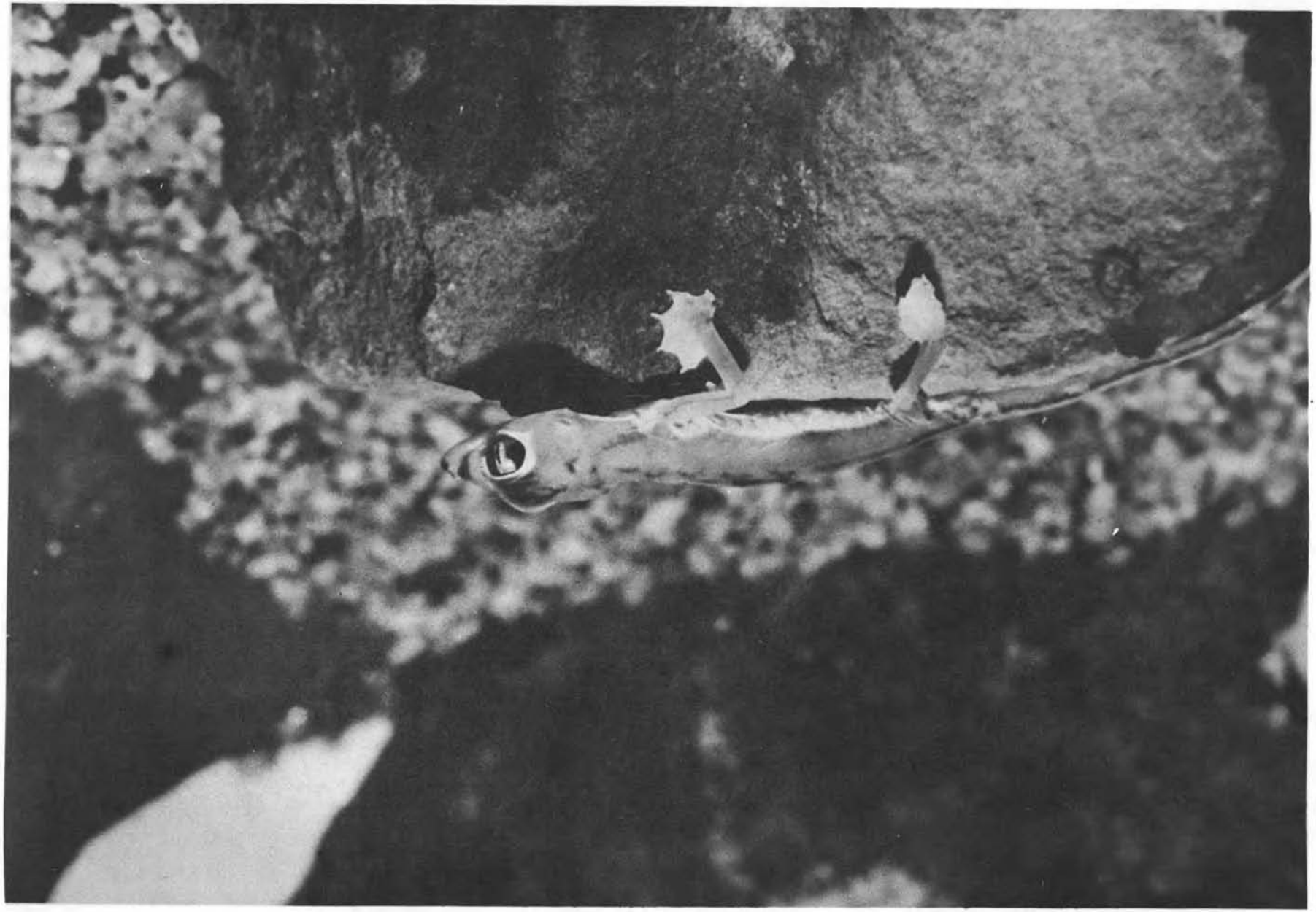
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Front - Drawing of Bufo americanus by Tom R. Johnson. Back - Photo of Palmatogekko rangei, Namib Desert, Africa by Joseph T. Collins.



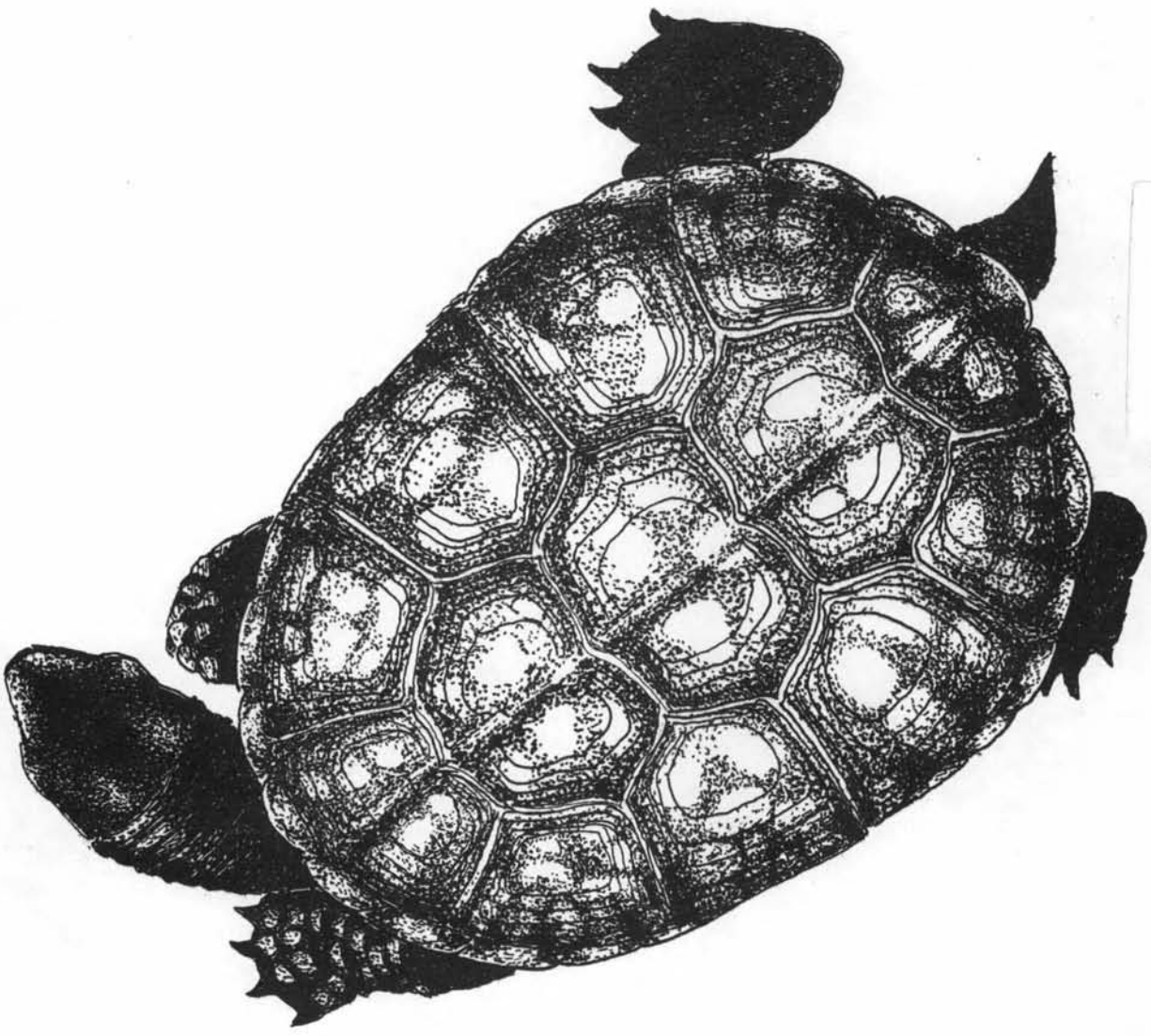
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Herpetological Review

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SEPTEMBER 1975

CONTENTS

Letter to the Editor by James R. Spotila..... 66

Abstracts from the 1975 SSAR-HL meetings at California State University, Fullerton, California, 10-14 August 1975..... 70

The Lake Erie Water Snake "Phenotype" in Central Missouri by Max A. Nickerson and Robert Krager..... 75

The Serpentarium at Cordoba, Argentina by Ismael di Tada and Jaima Villa..... 76

Geographical Distribution..... 78

Herpetological Folklore Stories: Who Believes Them? by Charla Lynn Jordan and Ronald Altig..... 81

Caribbean Research News..... 85

Current Literature..... 86

FRONT COVER: Drawing by Roberta Plummer, MPM

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Letter to the Editor

Dear Sir:

A very strong "second" to the comments of F. Harvey Pough in the December 1974 issue of Herpetological Review. Herpetologists have long had a reputation of destroying prime habitats in order to collect rare species from them. Thus making such species even more rare. A change in attitude is long overdue.

As we succeed in obtaining legislative protection for amphibians and reptiles our efforts at preserving these species comes back to affect our research. We too must abide by legislation designed to protect endangered species. Without a doubt this forces us to change the way in which we go about our business. More forethought, better planning, and greater concern for the welfare of experimental animals is required before we begin a research project. Our experimental design, facilities for housing and feeding animals and plans for disposition of animals after experiments are complete, has to be extensively documented in applications to state and federal agencies before permits are issued and research can begin. Long delays can be expected.

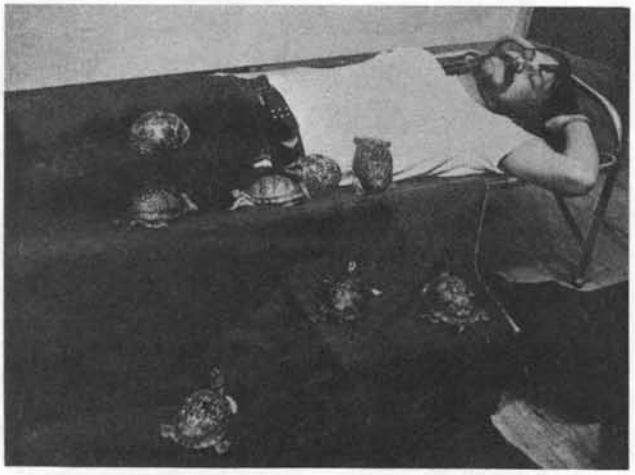
My experience in obtaining a federal endangered species permit to conduct thermoregulatory research on alligators may serve as an example. After an initial inquiry for information to the Interior Department I received copies of application forms and portions of the federal register containing regulations on endangered species. The completed application contained information on the following: all locations from which animals were to be collected, a brief description of the research to be conducted, and evidence of prior state approval of research activities. The last item was a problem since the state of New York would not grant a permit until I obtained a federal permit. Additional information was attached to the application as per regulations in sections CFR 13.12 and CFR 17.23 of the federal register. This included 1. Common and scientific names of species, number, age and sex of animals to be studied, 2. Details of project design, planned disposition of alligators after use and evidence of scientific expertise (curriculum vita, reprints, copy of grant proposal and copy of grant award letter), 3. Description and address of institution where laboratory studies were to be conducted, diagram of holding facilities, provisions for feeding alligators, availability of veterinary services, description of field sites and methods, 4. Reasons for using wild alligators instead of zoo animals, and 5. Plans for transport of alligators (method of shipment, type and size of containers, and supervision by project personnel).

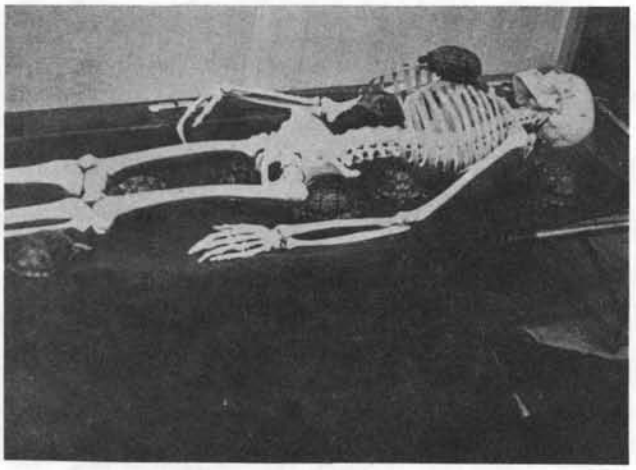
The application was sent to the Director of the U.S. Fish and Wildlife Service on 2 December 1974. After preliminary review by the Office of Endangered Species it was published in the Federal Register. Thirty days were allowed for comment. Sometime later the application was reviewed again by the Office of Endangered Species and personnel of the Division of Law Enforcement. Finally on 24 March 1975 a permit was issued - almost four months after application was made. This type of time delay can be quite important to those persons with a one or two year grant or to those interested in gathering seasonal data. In the meantime the New York Department of Environmental Conservation issued a permit to study alligators conditional on the receipt of a federal permit.

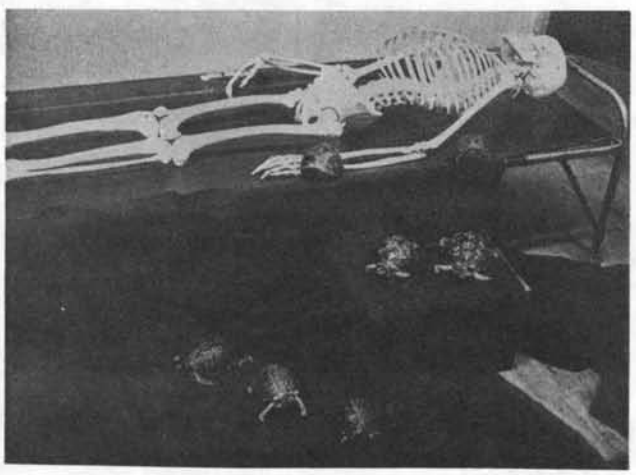
For those who wish to study endangered species I offer the following advice: 1. Plan your research carefully, 2. Document your application thoroughly, 3. Start early - four months is a minimum time for processing of an application and 4. Don't be surprised if you lose a field season to the bureaucracy. I suppose if that is what it takes to save the alligator then it is worth it.

Sincerely,

James R. Spotila
Assistant Professor



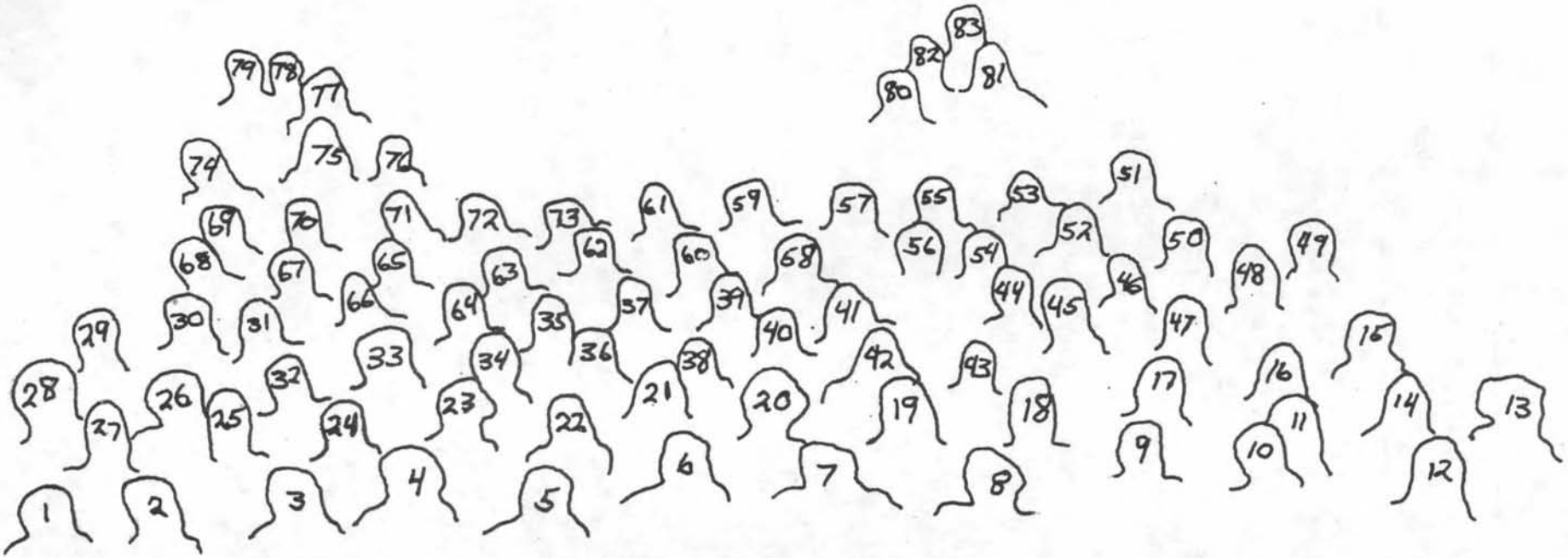


REVENGE OF THE REPTILES

Photo Essay by R. R. Koons, J. H. Frame
and J. R. Spotila



SSAR-HL
Fullerton 1975



1. Not known, 2. Richard Loomis, 3. Not known, 4. not known, 5. Philip Medica, 6. Jum Murphy, 7. Max Nickerson, 8. Steve Edwards, 9. Robert Bezy, 10. Joe Tihen, 11. Joe Mitchell, 12. Richard Etheridge, 13. Jammie Jenkins, 14. Ed Rodelspeyer, 15. George Renwick, 16. Sandra Limerick, 17. Kitty Eames, 18. Laurie Vitt, 19. Mark Renwick, 20. Not known, 21. Mike McCoid 22. Holly Berry, 23. Shirl Neagle, 24. Harvey Fisher, 25. Glen Stewart, 26.Not known, 27. Ken Brown, 28. Not known, 29. Carl Leib, 30. Not known, 31. Linda Treub, 32. Charles Counts, 33. Chuck Crumly, 34. John Wright, 35. Becky Papendick, 36. Tom Fritts, 37. Jack Fouquette, 38. Sue Palko, 39. Dan Watson, 40. Bob Patterson, 41. Patty Schwalm, 42. Jean Hogy, 43. Elenor Benes, 44. Mike Long, 45. Jim Huheey, 46. Chuck Carpenter, 47. Doug Rossman, 48. Steve Wylie, 49. A. Schuette, 50. Tom Porter, 51. George Folkert, 52. Arden Brame, 53. Steve Ayala, 54. Gorden Henley, 55. John Bickham, 56. Jim Bacon, 57. Dean Metter, 58. Curt Gage, 59. Dean Scott, 60. Robert Furlong, 61. Robert Applegate, 62. Dick VanLoben Sels, 63. John Brode, 64. Andy Hughes, 65. Crawford Jackson, 66. John Applegarth, 67. Ron Brandon, 68. Richard Worthington, 69. Bill Duellman, 70. Henri Seibert, 71. Roy McDiarmid, 72. Not known, 73. Carl Babb, 74. Ron Heyer, 75. Holly Starrett, 76. Joel Weintraub, 77. Not known, 78. William Pyburn, 79. William Presch, 80. Mick Bondello, 81. Al Romspert, 82. Jim Lacky, 83. Ron Whiteman.

The key is based on an imcomplete sign-up list and from memory. I apologize to those whose names are lacking or may have been mixed up. .

ABSTRACTS FROM THE 1975 SSAR-HL MEETINGS
AT CALIFORNIA STATE UNIVERSITY, FULLERTON, CALIFORNIA, 10-14 AUGUST 1975

AYALA, STEPHEN C. (Universidad del Valle, A. A. 5390, Cali, Colombia). Malaria in Reptile Populations.

By human morbidity criteria, malaria is a widespread, debilitating disease of grassland and forest lizards, yet its impact remains unevaluated. With a single toe-clip blood film from each animal, it could be included in any community structure study. Prevalence frequently surpasses 30% and grave anemia may occur during the initial weeks or in later relapses (often coinciding with host reproductive periods). Pathogenicity may be slight (Plasmodium rhadinurum), moderate (P. floridense) or severe (P. mexicanum). Severely affected lizards are retiring and lethargic and many probably die unannounced in their retreats, or soon after capture. Chronic infections predominate in older animals.

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BICKHAM, JOHN W. (Department of Biological Sciences, Texas Tech University). Chromosome Homology and Phylogenetic Relationships of Emydid Turtles.

Cytogenetic procedures were used to study 10 species of emydids, 2 testudinids, and 1 chelydrid. The procedures used included standard karyotypes, meiotic analysis, G-banding, C-banding, and Q-banding. The emydid subfamily Batagurinae is the primitive stock for the entire group. The batagurine genera Sacalia and Mauremys possess a karyotype which is considered primitive based on its widespread occurrence, the presence of a heterochromatic knob in pachytene, and the presence of a small, metacentric macrochromosome which is largely repetitive DNA. This heterochromatic chromosome is not present in emydids and chelydrids with derived karyotypes but is present in some testudinids.

BRANDON, RONALD A. (Department of Zoology, Southern Illinois University at Carbondale, Carbondale, Illinois 62901). Spontaneous and Induced Metamorphosis of Ambystoma dumerilii Under Laboratory Conditions.

Although Ambystoma dumerilii is not known to transform in nature, many wild-caught adults maintained in a laboratory colony, and first generation laboratory-bred animals, underwent spontaneous metamorphic changes. Metamorphosis was invariably fatal. No animal survived more than 5 months after metamorphosis began; nearly half died within a month. Four and six-month-old laboratory-bred larvae and three wild-caught animals all transformed when treated with L-thyroxine. None lived more than 48 days after metamorphosis began.

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BROWN, WESLEY M. (Biology Division, Calif. Inst. of Technology, Pasadena, California 91125) and JOHN W. WRIGHT (Section of Herpetology, Natural History Museum, Los Angeles, California 90007). Mitochondrial DNA and the Origin of Parthenogenesis in Whiptail Lizards (Cnemidophorus).

Bacterial restriction endonucleases that cleave double stranded DNA at specific base sequences allow for the determination of both the frequency and the relative positions of these sequences in a mitochondrial DNA (mt DNA) molecule. We have used the restriction enzymes Eco RI, from Escherichia coli, and Hind III, from Haemophilus influenzae, to cleave the mt DNAs of several species of Cnemidophorus. With the use of agarose gel electrophoresis and electron microscopy, the resulting DNA fragments can be identified, measured and compared interspecifically. In this manner, it is possible to identify the maternal species involved in the initial

hybridization resulting in parthenogenesis, since mt DNA is both extranuclear and maternally inherited.

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CONGDON, J. D., L. J. VITT, and N. DICKSON (Dept. of Zoology, Arizona State University, Tempe, Arizona 85281). Evolutionary Strategies in Lizard Tail Autotomy.

Tail break strategies are evaluated in several species of lizards variously adapted for tail autotomy. Data include observations on use of tail for predator escape and tail break frequencies in natural populations. Comparative data on regeneration rates and energy allocation to tail regeneration are presented and discussed in an evolutionary context. Additional information on lipid and water content of original and regenerated tails are presented.

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CONGDON, J.D., L.J. VITT, and N.F. HADLEY (Dept. of Zoology, Arizona State University, Tempe, Arizona 85281). Comparative Egg Energetics and Reproductive Effort in Uniparental and Biparental Whiptailed Lizards (Genus Cnemidophorus).

Caloric estimates of reproductive effort are compared between uniparental and biparental whiptailed lizards and between large and small whiptailed lizards, regardless of reproductive mode. Differences in egg size and number are discussed in an evolutionary context. New data on reproduction are presented and differences in the relationship of clutch size to body size are discussed.

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GILLINGHAM, JAMES C., CHARLES C. CARPENTER (University of Oklahoma), BRUCE J. BRECKE, and JAMES B. MURPHY (Dallas Zoo). Courtship and Copulatory Behavior of the Mexican Milk Snake, Lampropeltis triangulum sinaloae.

Three complete courtship and copulatory sequences were observed in a pair of Mexican milk snakes, Lampropeltis triangulum sinaloae between July 1974 and March 1975. The third copulatory sequence was recorded on movie film and videotape for detailed analysis. These snakes show the following three major divisions of courtship and copulatory behavior: tactile-chase, tactile-alignment and intromission and coitus. Although these phases follow a general colubrid pattern, careful analysis has shown specific differences.

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NAEGLE, SHIRL R. and W. GLEN BRADLEY (University of Nevada, Las Vegas, 4505 Maryland Parkway, Las Vegas, Nevada 89154). Influence of Temperature and Body Weight on Oxygen Consumption in the Desert Tortoise Gopherus agassizi.

Oxygen consumption, VO_2, was measured in 61 desert tortoises, Gopherus agassizi, ranging in size from 16.4g to 5562.4g. Measurements were taken over a temperature range of 8C to 42C. The Q_{10} for oxygen consumption between 10 to 20C, 20 to 30C and 30 to 40C were 3.2, 2.3 and 1.8 respectively. Tortoises less than 500g had significantly higher ($P < 0.05$) VO_2 rates than tortoises greater than 500g. VO_2 was found to be both temperature and size dependent and predictive equations were derived. VO_2 at 30C was less than Bartholomew and Tucker's (1964) predictive equation for lizards when total body weight was used but greater when body weight minus shell weight was calculated.

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PATTERSON, ROBERT (696 Milford Road, Orange, California 92667). Distribution Determination of Gopherus agassizi.

A study of the distribution of the desert tortoise, Gopherus agassizi, was undertaken as a first step in its future protection and management. The distribution study involved the use of museum specimen records, literature records, surveys of personal sightings by professional herpetologists, Federal and State Monument and Park Rangers, and observations of high school biology teachers, their students and other amateurs. Based on this study, the data from amateurs can add substantive information to rare and endangered species studies besides being a new and positive method for involving amateurs in rare and endangered species work.

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PETERSON, ELLENGENE (Dept. of Psychology, University of California, Riverside), G. W. NORTON, and ANN RICHARDSON (Dept. of Psychology, California State University, Los Angeles. Spatial Reversal Learning in Anolis carolinensis.

The use of reversal learning as a paradigm in comparative behavioral studies is well established. Such as experimental model is relevant to questions of learning, discriminative capacities, and to studies of the neural substrates of behavioral plasticity. In reptiles, however, turtles and caimen are the only groups well represented in reversal learning experiments. The present study reports the performance of six lizards (Anolis carolinensis) on a spatial reversal problem. The animals were trained against position preference on a modified Y-maze with return to home cage as reinforcement. Criterion for learning was 8/10 correct for two consecutive blocks of 10 trials (four days). All animals have shown progressive improvement as measured by error scores over successive reversals.

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PYBURN, WILLIAM F. (Department of Biology, The University of Texas at Arlington, Arlington, Texas 76019). The Function of Eggless Capsules in Nests of the Frog Phyllomedusa hypochondrialis.

Eggless, fluid-filled capsules in the nests of Phyllomedusa hypochondrialis supply water to the developing embryos. Under dry conditions embryos develop normally with eggless capsules, but die in the absence of eggless capsules if not kept moist. The eggless capsules, produced by the oviducts of the female at the time of oviposition make the embryos independent of environmental water during prehatch development. This evidence indicates that, in the evolution of the amniote egg, the shell could have preceded the foetal membranes, at least in so far as the embryos' dependence upon environmental water is concerned.

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RAND, A.S. (Smithsonian Tropical Research Institute, P.O. Box 2072, Balboa, Canal Zone) and W. R. HEYER (Amphibians and Reptiles, Smithsonian Institution, Washington, D.C. 20560). Foam Nest Construction in the Leptodactylid Frogs Leptodactylus pentadactylus and Physalaemus pustulosus.

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RICHARDSON, ANN M. and MARILYN BROWN (California State University, Los Angeles, 5151 State University Drive, Los Angeles, California 90032). Operant Thermoregulatory Behavior in the Desert Iguana, Dipsosaurus dorsalis.

Thermoregulatory operant behavior of lizards has been limited to the use of aversive stimuli. The present study demonstrates: (1) acquisition of a lever pressing response by desert iguanas for positive (heat and light) reinforcement, and (2) predicted

relationships of this response to the lizards' control of their environmental temperature. The data indicate that the desert iguanas readily acquired a lever pressing response for positive reinforcement establishing a substrate thermal activity range of 31.7^{o}-42.2^{o} under a continuous reinforcement 10 second reinforcement schedule. Operant procedures, without the use of severe stress variables would seem to be, for these animals, the research method of choice for behavioral thermoregulation, sensory capability, and comparative learning studies.

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ROSSMAN, DOUGLAS A. (Louisiana State University Museum of Zoology, Baton Rouge, Louisiana) and ALBERT SCHWARTZ (Miami-Dade Community College, Miami, Florida). Interspecific and Intergeneric Relationships of the Hispaniolan Colubrid Snake Genus Ialtris.

On the basis of color pattern and head shape Ialtris parishi and a presently undescribed species clearly are very closely related and differ markedly from I. dorsalis in these characters. Nevertheless, the nature of their dentition and hemipenes links these species and sets them apart from members of all other Antillean genera. Maglio's conclusion that Ialtris shows its greatest similarity to Alsophis, particularly in skull characters, is examined and challenged. The relationships of Ialtris to other Antillian "xenodontine" colubrid snake genera remain obscure.

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TALBOT, JIM (Department of Biological Sciences, University of Southern California, Los Angeles, California 90007). Preliminary Egg Mortality Studies on Two Species of Tropical Anoline Lizards (Sauria: Iguanidae).

Mortality studies in undisturbed primary forest and cacao groves were conducted on eggs extracted from gravid females of two anoline lizard species at one tropical rainforest locality in Costa Rica. Overall mortality, expressed as the percentage of eggs dying, killed, or disappearing from the egg oviposition site over a 40 day period approached 50%. Egg mortality in undisturbed primary forest was higher than in the cacao grove. These results suggest that egg mortality may be an important factor regulating lizard abundance at any one locality. Differences between habitats may reflect physical microhabitat differences (in depth of leaf litter or in dessication rates) as well as the intensity of predation on eggs laid in the leaf litter.

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VAN LOBEN SELS, R.C., L.J. VITT, and R.D. OHMART (Dept. of Zoology, Arizona State University, Tempe, Arizona 85281). Aspects of Feeding Ecology and Habitat Utilization in Three Sympatric Arboreal Desert Lizards.

Three species of sympatric arboreal desert lizards, Urosaurus ornatus, U. graciosus, and Sceloporus magister were studied over their activity period in 1974-75. Differences in microhabitats and utilization of food are discussed.

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VAN LOBEN SELS, R.C., L.J. VITT, R.D. OHMART, and C. REPKING (Dept. of Zoology, Arizona State University, Tempe, Arizona 95281). Home Range and Measurement of Dispersion in Selected Desert Lizards.

A method of analyzing spatial relationships among the home ranges of selected desert lizard species is described. This method was developed by Lee Metzgar and Richard Hill for small mammal population studies. The amount of overlap observed for a given set of home ranges is compared with the overlap that would be expected if those home ranges were distributed randomly within the habitat.

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VIAL, JAMES L. (Department of Biology, University of Missouri, Kansas City, Missouri 64110). Cavernicolous Eggs and Larvae of an Enigmatic Plethodontid Salamander.

A highly unusual salamander egg clutch taken deep within the aphotic region of a Missouri cave is described. Comparisons are made with eggs of other salamanders known to frequent caves. The hatchling larvae are also contrasted with literature descriptions and museum specimens. Unique differences are found in the manner of egg deposition, hatchling size and certain body proportions as well as pigmentation and behavior. Although the eggs and larval stages of several cavernicolous species are unknown, of the species for which larval descriptions are available the resemblance is closest to Eurycea lucifuga.

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VITT, L.J. and J.D. CONGDON (Dept. of Zoology, Arizona State University, Tempe, Arizona 85281). Reproductive Effort and Body Shape in Lizards: Resolution of a Paradox.

Data on reproductive effort (clutch calories/total calories) in a variety of lizard species are presented. These data suggest that body shape in lizards, selected for in view of predator escape and foraging strategies, are better predictors of instantaneous reproductive efforts than resource availability or the species' position on an r - K continuum.

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VITT, L.J., R.C. VAN LOBEN SELS, and R.D. OHMART (Dept. of Zoology, Arizona State University, Tempe, Arizona 85281). Aspects of the Thermal Ecology of Three Sympatric Arboreal Desert Lizards.

Species differences in body temperatures in addition to seasonal differences in body temperatures are discussed in three sympatric arobreal lizards, Urosaurus ornatus, U. graciosus, and Sceloporus magister. These data are evaluated in view of differences in microhabitats utilized by the various species, and differences in the thermal regimes of portions of the trees inhabited by these species. Additional data on mid-winter body temperatures are presented.

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WEBB, ROBERT G. (Department of Biological Sciences, University of Texas at El Paso, El Paso, Texas 79968). A Review of the Mexican Wandering Garter Snake, Thamnophis elegans errans Smith.

Thamnophis elegans errans is confined to the pine-oak, forested highlands of the Sierra Madre Occidental and is known from the Mexican states of Chihuahua, Durango, and Zacatecas. Thamnophis e. errans invariably has 19-19-17 dorsal scale rows, 7 supralabials, and an immaculate belly; specimens from northwestern Chihuahua indicate intergradation in these characters with Thamnophis elegans vagrans. Two unique features of T. e. errans are the pale orange belly in specimens exceeding 350 mm body length, and the entirely black tongue.

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WEINTRAUB, JOEL D. (Dept. of Biological Science, California State University-Fullerton, Fullerton, California 92634). Activity Patterns of Young Toads (Scaphiopus hammondi).

Activity pattern of tadpoles and recently emerged toads of the spadefoot toad, Scaphiopus hammondi were investigated in the field and in the laboratory. Tadpoles inhabit temporary pools and do not possess well defined activity patterns but are continuously active. Young roads leave the pond and find day-time refuges under plants, cow dung, and in cracks in the mud around pools. Young toads show an early evening activity peak and many a second peak just after sunrise which is under circadian control. This rhythm is established upon metamorphosis. At night young toads forage around the pools.

THE LAKE ERIE WATER SNAKE "PHENOTYPE" IN CENTRAL MISSOURI

The complete, or nearly complete, loss of a dorsal color pattern is well established in some populations of snakes (Nickerson & Mays, 1968). One subspecies of water snake, Natrix sipedon insularum, is primarily characterized by this loss (Conant & Clay, 1937).

On 2 June 1971 a Natrix sipedon, lacking a dorsal color pattern, was collected by Mark Helms just S of Eldon, Miller County, Missouri. Subsequent field work over the next three years produced some 120 Natrix sipedon from this site. Only one additional snake (taken June 1972) was found to be lacking the dorsal pattern (Figure 1).

The aberrant snakes were maintained in captivity for breeding experiments. The snake taken on 2 June 1971 died in August, 1973. The second snake remains alive in the collection of Max Allen's Zoological Gardens, Eldon, Missouri. Both snakes were of similar length in June, 1972 which suggests the possibility of them being litter mates.

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Conant, R. & W. M. Clay. 1937. A new subspecies of water snake from islands in Lake Erie. Occas. Pap. Mus. Zool. Univ. Mich. (346):1-9 + 3 pls.

Nickerson, M. A. & C. E. Mays. 1968. More aberrations in the color patterns of rattlesnakes (genus Crotalus). Wasmann J. of Biol. 26 (1):125-131.

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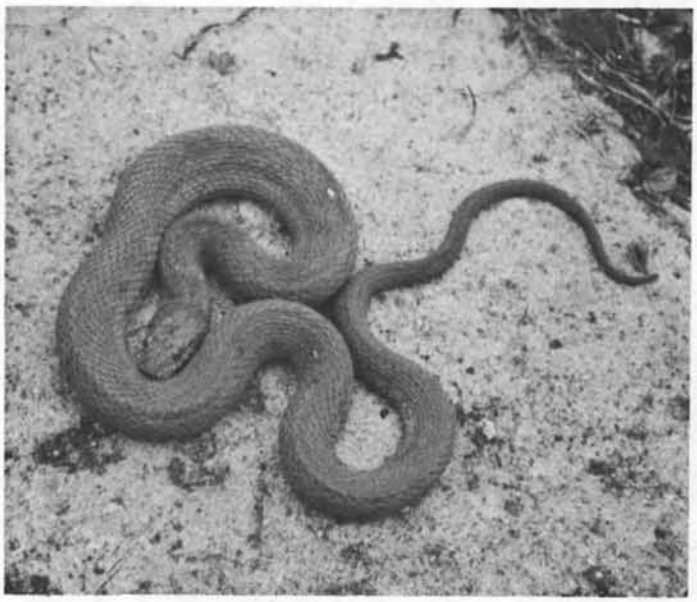


Figure 1. A water snake, Natrix sipedon from Miller County, Missouri, exhibiting loss of the dorsal color pattern.

Photo- Krager



The Original "Fall" Guy

THE SERPENTARIUM AT CORDOBA, ARGENTINA

by Ismael di Tada and Jaime Villa

The Serpentarium at Cordoba, Argentina, a part of the Universidad Nacional de Cordoba's Centro de Zoologia Aplicada (Center for Applied Biology), was formally inaugurated in February, 1973, as the result of the joint efforts of the University and the Ministry of Public Works.

The Centro has its own, very modern, two-story building, located on the grounds of the Cordoba Zoological Park. The upper floor is exclusively devoted to live reptile displays, for the benefit of zoogoers; the lower houses the venomous snake facility, where snakes are milked and housed. Here, visitors can observe the milking process from a very close distance, but through the safety of a glass pane (Fig. 3).

Student tours, led by upper-class biology students and serpentarium staffers, are frequent in the serpentarium. An auditorium with audiovisual facilities is also available for lectures related to snakes, their importance, habits, and role at the serpentarium.

Snakes are collected, purchased, or exchanged from sources throughout the Provincia de Cordoba. The most common or widely-distributed species are the Yarara Chica (Bothrops neuwiedi), the rattlesnake (Crotalus durissus), the coralsnake (Micrurus frontalis), the hognosed Yarara Nata (Bothrops ammodytoides) and the Yarara de la Cruz (B. alternatus). Many harmless species, ranging from large boas to minute blind snakes, are kept for research or for display purposes.

Venom-producing snakes are subjected to special treatment. Immediately after being received they are housed in individual safety cages. Detailed records of their sex, weight, venom production, moults, etc., are kept. After venom extraction the snakes are force-fed a mixture of meat and ground bone equivalent to 10-20% of the snake's weight. The process is repeated every 15 days. Some 40 to 70 snakes are milked daily.

Since very dangerous species are used all these tasks are performed by biologists and highly-trained technicians, and the observance of strict safety measures has decreased the possibility of injuries among the snake-handling personnel.

Some 60,000 mg of dried rattlesnake venom were obtained in the first 9 months of 1974, along with 15,000 and 213,000 mg of Bothrops alternatus and B. neuwiedi, respectively. About 1,000 mg are necessary, per horse, to obtain an initial antigenic response capable of neutralizing 2.5 mg of purified venom per ml of serum.

The serpentarium provides dried venom to several Argentine institutions which produce mono, bi and polyvalent antivenins. A coralsnake (elapid) antivenin is under study.

Taxonomic, ecological and biogeographical research is also produced at the serpentarium and at the Centro in general. Dr. Jorge Abalos (Fig. 1), the Centro's director, Ismael E. di Tada (Fig. 2) and Ricardo Martori (Fig. 3), are three herpetologists with varied interests in the Argentine herpetofauna, especially of the Cordoba Province forms.

Serpentario de Cordoba
Casilla de Correos 122
Cordoba, Argentina, South America

Cornell University
Section of Neurobiology & Behavior
Ithaca, New York 14853

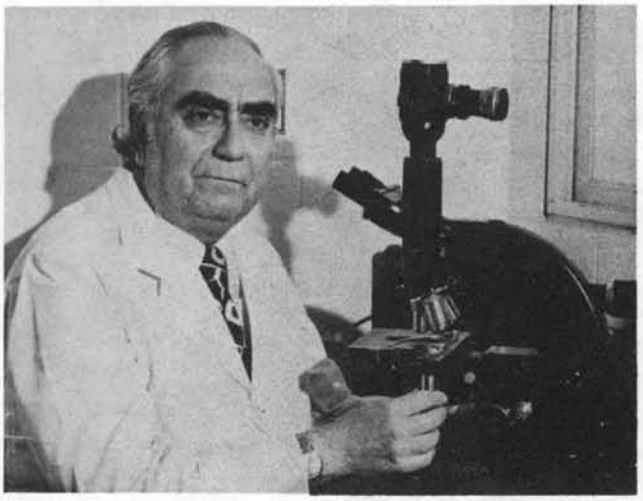


Fig. 1.--Dr. Jorge Abalos

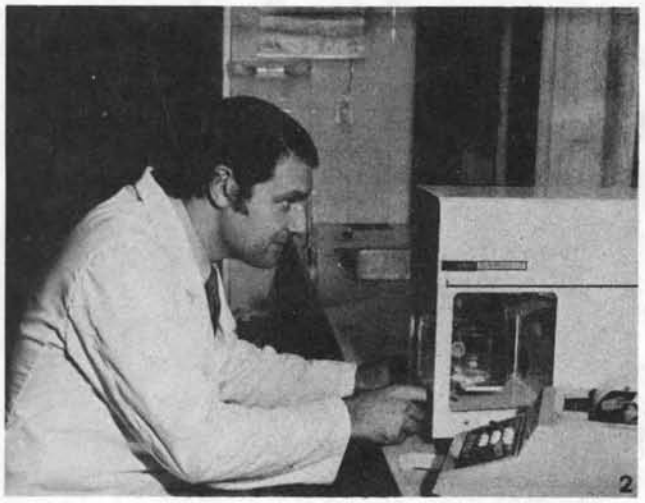


Fig. 2.--Ismael E. di Tada

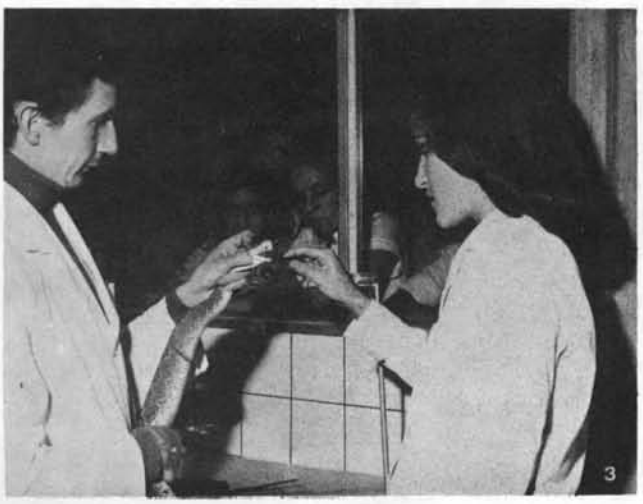


Fig. 3.--Ricardo Martori



Fig. 4.--Venom extraction room.

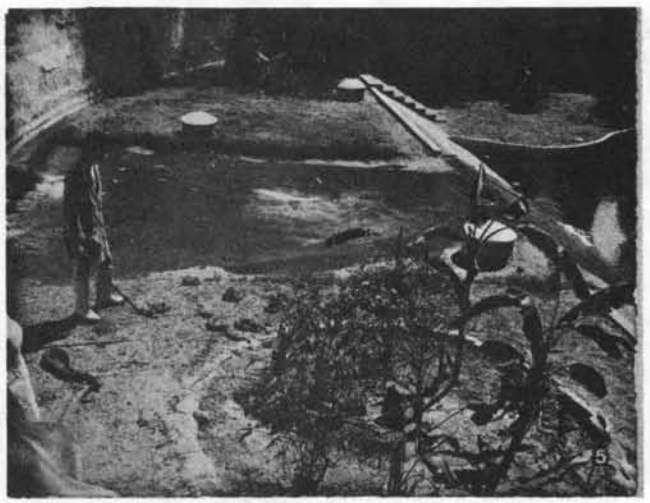


Fig. 5.--Outdoor snake enclosure



Fig. 6.--Laboratory

GEOGRAPHICAL DISTRIBUTION

Short Reports

DISTRIBUTIONAL NOTES ON REPTILES IN ILLINOIS. With the publication of P. Smith's survey (1961), the distribution of most Illinois reptiles became well documented. We report new records (some are apparently relictual populations) of five reptile species in Illinois. Specimens deposited in Southern Illinois University-Edwardsville are designated SIUE. Other specimens were captured, identified and released.

Clonophis kirtlandi (Kirtland's water snake). Effingham, Effingham Co. (specimens observed periodically from 1959-1974); extends range 30.5 mi SE of nearest record (Holman & Arai 1962). Other apparently isolated records in Illinois and Missouri were reported by Clark (1961), Holman & Arai (1962), Jones (1967), Moll (1962), Munyer & Parmalee (1967) and Smith (1961). These populations and the Effingham population may be relictual and the species may be becoming extinct on the western edge of its range. This species is usually found in wet meadows (Conant 1958) which are now scarce in Illinois due to gradual drying up of the wet prairies and use of most of the original prairie for agricultural purposes.

Thamnophis proximus (Western ribbon snake). Litchfield, Montgomery Co. (SIUE 562) and 5 mi E junction of Hwy 66 & Honey Bend Rd., Montgomery Co. (SIUE 564); extend range 34 and 40 mi NE of nearest record (Smith 1961).

Tropidoclonian lineatum (Lined snake). 7th St. & Central Ave., Roxana, Madison Co. (SIUE 552-558, 560); Reller St., Roxana (SIUE 561); and South Roxana, Madison Co. (SIUE 559); extend range 26-27 mi S of nearest Illinois record (Smith 1961) and 17 mi NE of nearest Missouri record (Anderson 1965). These records and the other six Illinois records (Smith 1961) are on the eastern edge of the range and are the only known populations east of the Mississippi River. Smith (1961) indicated that the Illinois populations are relictual and that changes in climate and the rise of agriculture may have caused the decline of Illinois populations.

Eumeces fasciatus (Five-lined skink). 2 mi S Bartonville, Peoria Co.; extends range 22 mi NE of nearest record (Smith 1961).

Terrapene ornata (Ornata box turtle). 3.1 mi N Hudson, McLean Co., 1 mi N Chillicothe, Peoria Co., and 3.5 mi SE Brooklyn, Schuyler Co.; extend range 44.5 mi ENE, 42 mi NE, and 29.5 mi W (respectively) of nearest records (Smith 1961). The McLean Co. record is located between the relictual population along the Illinois-Indiana border and the main part of the range in west central Illinois. Since all three turtles were from old field habitats in rural areas, they probably do not represent introductions by man.

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Submitted by LAUREN E. BROWN, RICHARD S. FUNK, DON MOLL AND JOHN K. TUCKER, Department of Biological Sciences, Illinois State University, Normal, IL 61761

RANGE EXTENSIONS AND NEW COUNTY RECORDS OF SOME TEXAS AMPHIBIANS AND REPTILES. Present in the Texas A&I University at Kingsville collection (TAIC) are records of some Texas herps which supplement those of Raun and Gehlbach (1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist.).

Range extensions are: Pseudacris streckeri.-Kenedy Co., 3 mi. S Mifflin (TAIC 1051),1.7 mi.S Sarita (TAIC 1450), 7.7 mi.S Mifflin (TAIC 2735, 2740, 2742, 2744), La Paloma Ranch, 8 mi. W Riviera (TAIC 3253, 3283), Mifflin (TAIC 3604); Kleberg Co., 4 mi. S Kingsville (TAIC 3606).These records extend the range of P. streckeri some 75 miles south of the nearest county record, Aransas County. Natrix grahami.-Dimmit Co., 3.9 mi. S Catarina (TAIC 1258); a range extension of almost 200 miles southwest of the nearest county record, Fayette County.

New county records are: Ambystoma opacum. - Panola Co., Murvual Reservoir (TAIC 3528). Notopthalmus viridescens.-Karnes Co., 11 mi. S Runge (TAIC 1538); Matagorda Co., Sloan Ranch, 10 mi. E Bay City (TAIC 2468, 2842). Hyla cinera. - Kenedy Co., 3.5 mi. S Sarita (TAIC 965). Pseudacris streckeri.- Kerr Co., Chaney Ranch, 13 mi. S Kerrville (TAIC 1050, 1863). Hemidactylus turcicus.-Kleberg Co., numerous specimens, from Texas A&I campus; Hidalgo Co., McAllen (TAIC 1363, 1382, 2749); Nueces Co., Robstown (TAIC 1441); San Patricio Co., Mathis (TAIC 1490); Maverick Co., Eagle Pass (TAIC 1882). Anolis carolinensis.-Kleberg Co., numerous specimens from the Texas A&I campus; Willacy Co., Raymondville High School(TAIC 3160).Crotaphytus collaris.-Maverick Co., 27 mi. N Eagle Pass (TAIC 136); Lubbock Co., Lubbock (TAIC 2551). Crotaphytus reticulatus. - Duval Co., 9 mi. S Freer (TAIC 3432). Phrynosoma modestum. - Winkler Co., Chonco Bluff (TAIC 1712). Sceloporus grammicus. - Refugio Co., Refugio (TAIC 1744) . Sceloporus undulatus. - Gaines Co., Seminole (TAIC 880). Ficimia olivacea.-McMullen Co., 21 mi. N Freer (TAIC 870). Natrix cyclopion. - Calhoun Co., 3.4 mi. NE Tivoli (TAIC 2854). Natrix grahami. - Refugio Co., 2 mi.NE Tivoli on Guadalupe River (TAIC 1895); Calhoun Co., 3.4 mi. NE Tivoli(TAIC 2855).Natrix rhombifera.-Maverick Co., 5 mi. S Eagle Pass (TAIC 1939), Manges Ranch, 1 mi. E Eagle Pass (TAIC 2142); Calhoun Co., Green Lake TAIC 2395). Tantilla atriceps.-Maverick Co., 6 mi. W Eagle Pass (TAIC 2149). Tropidoclonion lineatum. - Crockett Co., Ozona (TAIC 2540). Sistrurus catenatus.-Webb Co., U.S. 44, 1 mi. NE junction with U.S. 83 (TAIC 1930); Brooks Co., 2 mi. E Brooks Co. line on FM 755 (TAIC 2450).

All identifications verified by Dr. Allen H. Chaney, to whom I am indebted for access to the collection and help in writing this paper. Submitted by Glenn W. Merkord, Dept. of Biology, Texas A&I University at Kingsville, TX 78363.

NEW COUNTY RECORDS AND RANGE EXTENTIONS FOR TEXAS AMPHIBIANS AND REPTILES. The following records for Texas amphibians and reptiles supplement those of Raun and Gehlbach (1972, Amphibians and Reptiles in Texas, Dallas Mus. Nat. Hist., Bull. No. 2) and Lewis (1974, Herp. Rev. 5(1):21). Specimens listed in this report are deposited in the Northeast Louisiana University Vertebrate Museum (NLU), Monroe, La.

NEW COUNTY RECORDS. Caudata: Ambystoma tigrinum mavortium, Midland Co. (NLU 31798; Notophthalmus viridescens louisianensis, Madison Co. (NLU 35657-60). Salientia: Acris crepitans blanchardi, Motley Co. (NLU 31349-52); Bufo cognatus, Parmer Co. (NLU 18064); B. marinus, Cameron Co. (NLU 1431); B. speciosus, Hardeman Co. (NLU 28934), Maverick Co. (NLU 24809-20), McMullen Co. (NLU 36037-8); B. w. woodhousei, Lubbock Co. (NLU 31800-02); Gastrophryne carolinensis, Milam Co. (NLU 20884); G. olivaceus, Kleberg Co. (NLU 28983-6); Rana pipiens sphenocephala, Marion Co. (NLU 32255-62; Scaphiopus bombifrons, Mitchell Co. (NLU 36147-50); S. couchi, Robertson Co. (NLU 20895); S. hammondi, Parmer Co. (NLU 17689-90). Testudines: Dierochleys reticularia maria, Orange Co. (NLU 7713, 15018); Kinosternon f. flavescens, Ward Co. (NLU 36145); K. subrubrum hippocrepis, Smith Co. (NLU 36658); Malaclemys terrapin littoralis, Brazoria Co. (NLU 29556); Terrapene ornata, Madison Co. (NLU 16626), Sauria: Cnemidophorus sexlineatus, Jim Wells Co. (NLU 27377-85), Kaufman Co. (NLU 35911), Kinney Co. (NLU 28850); Crotaphytus collaris, Motley Co. (NLU 18293); Eumeces obsoletus, Garza Co. (NLU 36399); Holbrookia maculata, Coke Co. (NLU 17642), Dickens Co. (NLU 17648). Serpentes: Arizona elegans, Kent Co. (NLU 28936), Knox Co. (NLU 28958), Stonewall Co. (NLU 28906), Upton Co. (NLU 29995); Coluber constrictor, Smith Co. (NLU 36656); Crotalus atrox, Stonewall Co. (NLU 28898, 28949), Upton Co. (NLU 29985, 29996-7); Elaphe guttata emoryi, Dimmit Co. (NLU 36209), Jim Wells Co. (NLU 28974); E. obsoleta, Lampasses Co. (NLU 28717); Heterodon nasicus, Lynn Co. (NLU 17694); Lampropeltis c. calligaster, Smith Co. (NLU 36657); L. getulus splendida, Garza Co. (NLU 28897); L. triangulum, Kennedy Co. (NLU 28669); Leptotyphlops d. dulcis, Comal Co. (NLU 36687-9), Neuces Co. (NLU 761-7); Masticophis flagellum, Crosby Co. (NLU 18071), Dickens Co. (NLU 26543), Mitchell Co. (NLU 28714), Upton Co. (NLU 29984); Micrurus fulvius tenere, Uvalde Co. (NLU 28593); Natrix erythrogaster flavigaster, Milam Co. (NLU 22806); Pituophis melanoleucus, Hockley Co. (NLU 16077), Jim Hogg Co. (NLU 36438, 36947), Yoakum Co. (NLU 28942); Rhinocheilus lecontei tessellatus, Mitchell Co. (NLU 28989), Stonewall Co. (NLU 28925-7); Storeria dekayi texana, Milam Co. (NLU 20891-3, 22796-7, 28700); Tantilla nigriceps, Cooke Co. (NLU 16531-2), Jim Hogg Co. (NLU 36338), Lubbock Co. (NLU 17636), Midland Co. (NLU 17634-5); Thamnophis cyrtopsis ocellata, Crockett Co. (NLU 28716); T. m. marcianus, Garza Co. (NLU 31807-8), Lubbock Co. (NLU 16111-2), Parmer Co. (NLU 16113).

MARGINAL RECORDS. Caudata: Plethodon glutinosus albagula, Guadalupe Co. (NLU 15098-112, 17105-19). Salientia: Scaphiopus bombifrons, Terrell Co. (NLU 18091). Sauria: Phrynosoma modestum, Menard Co. (NLU 29408); Sceloporus olivaceus, Irion Co. (NLU 19733), Stonewall Co. (NLU 18076-8); Urosaurus ornatus, Winkler Co. (NLU 16093-4). Serpentes: Elaphe obsoleta, Irion Co. (NLU 29978).

RANGE EXTENSION RECORDS. Arizona elegans (Glossy snake). Henderson Co., 8 km NE Athens; 10 September 1970; T.P. Guidroz and P.S. Hambrick, NLU 28678. Extends known range 160 - 200 km to the northeast. First record east of the Trinity River. Perhaps this denotes a small disjunct population in this area of the state. Regina grahami (Graham's water snake). Bexar Co., San Antonio; no date (presumably late 1930's); NLU 24894. Fort Sam Houston; 26 May 1971; NLU 36043-4. These specimens verify the claims of earlier collectors (Baird and Girard, 1853, Smithsonian Misc. Coll., Art. 5; Strecker and Williams, 1927, Cont. Baylor Univ. Mus., 12:1-16; Brown, 1950, Baylor Univ. Stud., 257 p.) that R. grahami is present in Bexar Co. Raun and Gehlbach (op. cit.) reported these as dubious records. These records extend the range of R. grahami 160 - 200 km westward. Submitted by PATRICK S. HAMBRICK, Dept. of Zoology and Physiology, Louisiana State University, Baton Rouge, La. 70803.

HERPETOLOGICAL FOLKLORE STORIES: WHO BELIEVES THEM?

Charla Lynn Jordan and Ronald Altig

After being called from his bath by his wife screaming about a snake loose in the house, an elderly man knelt on the floor to peer under a chair. When the pet dog touched him gently, he had a heart attack, and when his wife again screamed about the snake as the rescue men carried him down the stairs, they dropped him and broke his leg. The perils of ophidiophobia are still with us!.

While talking to a person uninformed about herpetological facts, one can almost be assured of being upstaged by a sequel story or at least being asked if such-and-such is true. Conversely, rebuttals of such stories are often met with intense arguments. Such folklores have a wide geographic basis as snakes especially have entered into the lore of numerous cultures. The stories are handed down from generation to generation, and friends are seemingly more easily believed than "scientists".

Conversely, through technological and communicational advances, we may generalize that students today would be more aware and better informed than in the past. Therefore, by use of a simple survey, we attempted to determine the extent to which college students still believe herpetological folklores.

Materials and Methods

Questionnaires requesting the respondents' sex (race and religion were abandoned because of the reluctance of the respondents to give this information; state in which the person grew up and whether it was in an urban or rural environment were abandoned because of the low site tenacity of many respondents) were sent to faculty members of Adelphi University, Long Island, New York (A), University of California at Berkeley (B), University of Colorado (C), Michigan State University (D), and Mississippi State University (E). These persons were asked to have 100 members of a beginning biology course fill out the forms. Actual responses were as follows: (A) 96, 49 females, 47 males; (B) 100, 50, 50; (C) 63, 29, 34; (D) 92, 58, 34; and (E) 84, 38, 46. Because of unequal samples data are presented as percentages.

The respondents were asked to score the following subjects as "T" if they considered it true, "F" if they knew it was false or would consider it so without being told differently, "C" if they once had believed it but had changed their mind after reading a contradiction or being told by a competent person, or "O" if they had never heard of the subject.

1. Rattlesnakes will not cross a horse-hair rope.
2. Female snakes swallow their young to protect them from enemies.
3. Snakes swallow items bigger than their heads.
4. Toads give you warts.
5. Blue-tailed skinks ("scorpions") are poisonous.
6. Snakes sting or bite with their tongues.
7. Toads live indefinitely without air.
8. Coachwhip snakes whip their prey to death.
9. Milk snakes suck milk from cows.
10. Snakes hypnotize their prey with their eyes.
11. Rattlesnakes travel in pairs.
12. Snakes can crawl faster than a galloping horse.
13. Snakes cannot bite underwater.
14. Hoop snakes grab their tails in their mouths and roll downhill after you.
15. If the tail spine of a stinging snake pierces your skin or the bark of a tree, you and the tree will die.

16. A mutilated snake will not die until sundown.
17. A turtle that bites you will not turn loose until sundown or until it thunders.
18. Snakes are charmed by the sound of a flute.
19. Rattlesnakes rattle before they strike.
20. Rattlesnakes cannot strike until they coil.
21. A jointed snake or glass snake can break into several pieces but can rejoin after sundown.
22. Blood squirted from the eye of a horned toad causes blindness.
23. Snakes will attack unprovoked rather than run.
24. Toads are poisonous.
25. Hognose snakes (puffing adder, spread adder, spread-head, hissing snake, blow viper) are poisonous.

Statements 3 and 24 were included as facts, although the respondent might have to be better informed to know that toads are poisonous only via the skin than to know that snakes can swallow items larger than their heads. The latter seems to be one of the first "facts" learned about snakes. Also, Grogan (1974) has reported pathological effects from the bite of a hognose snake (Heterodon), but we will ignore that for the moment. Bias was no doubt introduced by the variability in the familiarity with common names, some of only local origin, and the class at Michigan State University, which was a second year biology course.

Results and Discussion

Table 1 presents the percentages of the responses in each of the four categories. We looked only at means and obvious trends, and purposely avoided statistical treatment. All statements had been heard of by someone (although the average number left to respond after the "0" column was subtracted was only 299 or 68.7% of the total), there were no statements that were believed by all (statements 15 and 16 were marked true by only 8), and no statement was considered false by all.

Most (88.8 - 97.8%) of the people recognized item 3 as true, although 16 people had never heard of this idea. On the other hand, 62.5 - 85.7% thought that No. 24 was false.

In general, it can be said that most students do not believe the folklores; means of the false columns ranged from 48.1 - 57.1 ($\bar{x}$ = 52.7)%, while the true column ranged from 12.6 - 18.1 ($\bar{x}$ = 15.0)%. Contrary to expectations, students from no particular geographic area believed many more of the stories than any others. However, there was a more pronounced difference, between areas, concerning the percentage of the stories that the respondents had heard. Adelphi and Berkeley students, both from metropolitan areas, had larger percentages (heard of fewer stories) (32.6 and 34.7% respectively) than the other three (C = 23.7, D = 26.9, E = 23.7%). A number of the folklores seemed to be of southern origin (at least based on southern species) and folklores seemingly are more common in rural areas, so these two concepts probably account for these differences. Also, fewer of the students from these two schools had changed their minds(2.4, 2.6%) relative to students at the other schools (4.8, 6.0, 5.9%). Note that statements 4 and 18 (toads give you warts and snakes are charmed by a flute) are the two statements with the highest "changed my mind" percentages. Typically, few of the students had changed their minds; they considered most of the stories false all along.

There were slight, but no doubt nonsignificant, differences in the responses of the two sexes. Except in Mississippi where boys believed more than girls by an average of 2% (based on means of "T" and "F" columns), boys believed less than girls (0.1 - 3.3%).

Girls had heard of fewer stories than boys by about 13 (2.3 - 23.3%), and girls, except in Mississippi (boys 2.4% more than girls), had changed their minds more often than boys (0.3 - 3.2%). These conclusions seem likely since boys probably encounter and discuss such topics more frequently.

Items 5, 19, and 20 often had higher true scores. No. 5 may have been high because of a misinterpretation of the typically southern name of "scorpion" for blue-tailed skinks (Eumeces); the other two were apparently "known facts".

So it appears that a belief in herpetological folklores has a minority foothold which is reasonably uniform across the country. If the parents and grandparents of these students and subsequent students could be surveyed, we would expect a steady increase in the "F" responses. If not, perhaps we are not educating students about lower vertebrates. But, on the other hand, what has happened to many campfire stories!

Literature Cited

Grogan, W. L., Sr. 1974. Effects of accidental envenomation from the saliva of the eastern hognose snake, Heterodon platythinos. Herpetologica 30:248-249.

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Table 1. Percentage of responses to four possible answers for the twenty-five categories.

	T	F	C	O	T	F	C	O
	Adelphi University				University of California			
1.	3.1	26.0	1.0	69.8	2.0	32.0	1.0	65.0
2.	26.0	36.4	0.0	48.9	12.0	43.0	2.0	43.0
3.	92.7	1.0	0.0	6.2	97.0	1.0	2.0	0.0
4.	6.2	66.6	21.8	5.2	4.0	82.0	10.0	4.0
5.	37.5	8.3	0.0	37.5	46.0	19.0	1.0	34.0
6.	18.7	72.9	4.1	4.1	8.0	80.0	4.0	13.0
7.	11.4	70.8	2.0	12.1	3.0	81.0	2.0	13.0
8.	9.3	22.9	0.0	67.7	4.0	28.0	0.0	68.0
9.	4.1	51.0	0.0	44.7	6.0	53.0	1.0	40.0
10.	21.8	52.0	5.2	20.8	18.0	58.0	4.0	20.0
11.	2.0	50.0	2.0	45.8	6.0	52.0	1.0	41.0
12.	9.3	59.3	1.0	20.8	9.0	57.0	1.0	33.0
13.	7.2	42.7	0.0	50.0	1.0	52.0	0.0	47.0
14.	12.5	60.4	0.0	39.5	5.0	51.0	3.0	41.0
15.	3.1	57.2	0.0	39.2	0.0	52.0	1.0	47.0
16.	3.1	71.8	4.1	20.8	0.0	64.0	0.0	36.0
17.	1.0	70.8	1.0	26.0	2.0	63.0	1.0	34.0
18.	28.1	62.5	5.2	19.7	22.0	53.0	11.0	14.0
19.	78.1	13.2	2.0	16.6	68.0	23.0	5.0	4.0
20.	27.0	39.5	2.0	31.2	41.0	34.0	4.0	21.0
21.	1.0	63.5	0.0	35.4	1.0	64.0	1.0	34.0
22.	5.2	36.4	0.0	44.7	4.0	47.0	0.0	49.0
23.	18.7	59.3	2.0	19.7	12.0	66.0	6.0	16.0
24.	17.7	62.5	2.0	17.7	4.0	67.0	3.0	26.0
25.	34.3	13.5	3.1	48.9	41.0	9.0	2.0	48.0

	University of Colorado				Michigan State University			
1.	9.5	34.9	0.0	55.5	0.0	41.3	2.1	56.5
2.	17.4	44.4	3.1	34.9	15.2	44.5	6.5	33.6
3.	88.8	4.7	1.5	4.7	97.8	1.0	0.0	1.0
4.	4.7	74.6	25.3	0.0	1.0	67.3	30.4	1.0
5.	66.6	9.5	0.0	23.8	47.8	10.8	3.2	38.0
6.	11.1	76.1	4.7	7.9	5.4	79.3	6.5	8.6
7.	6.3	73.0	1.5	19.0	2.1	75.0	11.9	10.8
8.	6.3	42.8	0.0	50.7	3.2	44.5	1.0	51.0
9.	3.1	63.4	7.9	25.0	5.4	68.4	7.6	18.4
10.	20.6	53.9	4.7	20.6	16.3	55.4	13.0	15.2
11.	11.1	49.2	4.7	4.9	10.8	57.6	1.0	30.4
12.	7.9	71.4	1.5	19.0	11.9	67.3	1.0	19.5
13.	6.3	58.7	1.5	33.3	7.6	45.6	0.0	46.7
14.	9.5	57.1	6.3	26.9	7.6	58.6	5.4	28.2
15.	0.0	61.9	3.1	34.9	1.0	53.2	1.0	44.5
16.	1.5	71.4	6.3	20.6	2.1	68.4	5.4	23.9
17.	0.0	76.1	1.5	22.2	1.0	65.2	2.1	31.5
18.	26.9	49.2	15.8	7.9	29.3	44.5	21.7	4.3
19.	80.9	9.5	6.3	3.1	70.6	16.3	9.7	3.2
20.	57.1	26.9	4.7	9.5	43.4	39.1	4.3	13.0
21.	1.5	73.0	1.5	23.8	0.0	71.7	0.0	28.2
22.	23.8	58.7	6.3	30.0	2.1	44.5	2.1	51.0
23.	15.8	71.4	3.1	9.5	4.3	84.7	2.1	8.6
24.	9.5	65.0	6.3	19.0	10.8	72.8	4.3	11.9
25.	30.1	26.9	1.5	41.2	2.5	45.6	2.1	27.1

	Mississippi State University				Total			
1.	4.7	33.3	2.3	59.5	3.9	33.3	1.3	61.3
2.	21.4	53.5	1.1	23.8	18.4	44.4	2.5	36.8
3.	89.2	4.0	0.0	5.9	93.1	2.3	.7	3.6
4.	2.3	93.6	26.1	1.1	3.6	76.8	22.7	2.3
5.	55.9	17.8	2.3	23.8	50.8	13.1	1.3	31.4
6.	7.1	80.9	10.7	1.0	10.0	77.8	6.0	6.9
7.	3.5	76.1	3.5	16.6	5.3	75.3	4.2	14.3
8.	9.5	42.8	5.9	53.5	6.5	36.2	1.4	58.2
9.	4.7	67.8	2.3	25.0	4.7	60.7	3.8	30.6
10.	25.0	52.3	3.5	19.0	20.3	54.3	6.1	19.1
11.	21.4	42.8	4.7	30.9	10.3	50.3	2.7	36.6
12.	13.0	71.4	0.0	15.4	10.2	65.3	.9	21.5
13.	20.2	59.5	7.1	13.0	8.5	51.7	1.7	38.0
14.	4.7	58.3	3.5	33.3	7.9	57.1	3.6	33.8
15.	4.7	54.7	3.5	36.9	1.8	55.8	1.7	40.5
16.	2.3	64.2	9.5	23.8	1.8	68.0	5.1	25.0
17.	5.9	72.6	11.9	9.5	2.0	69.5	3.5	24.6
18.	20.2	51.1	15.4	13.0	25.3	52.1	13.8	11.8
19.	28.3	30.9	3.5	7.1	65.2	18.6	5.3	6.8
20.	40.4	35.7	3.5	20.2	41.8	35.0	3.7	19.0
21.	14.2	70.2	5.9	21.4	3.5	68.5	1.7	28.6
22.	4.7	54.7	3.5	36.9	8.0	48.3	2.4	42.3
23.	7.1	82.1	1.1	9.2	11.6	72.7	2.9	12.6
24.	2.3	85.7	2.3	9.5	8.9	70.6	3.6	16.8
25.	22.6	47.6	1.2	28.5	26.1	28.5	2.0	38.7

Caribbean Research News

JOHN W. BICKHAM and ROBERT BAKER (Dept. of Biological Sciences, Texas Tech University, P.O. Box 4149, Lubbock, Texas 79409) spent eight weeks in the Caribbean collecting turtles for cytogenetic study. Seven species (Chrysemys, Rhinoclemmys, Kinosternon, Geochelone) were collected from Jamaica, Hispaniola and Trinidad; work on the karyotypes and chromosome banding of the species is continuing, with the hope of incorporating some of these data into a larger study on emydid karyotypic evolution.

JEANNE MORTIMER (University of Florida) is in Nicaragua studying the feeding ecology of the green turtle in its home-pasture habitat.

SCOTT J. MANESS and ROBERT GODSHALK, zoologists employed by the Peace Corps and the Ministerio de Agricultura y Cria of Venezuela, are studying the biology and conservation of Venezuelan crocodilians. They are also studying the ecological and altitudinal distribution of the reptiles of Rancho Grande, Parque Nacional Henri Pittier, Venezuela.

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The next ESHL Eastern Seaboard Herpetological League will be sponsored by WHS and VHS. It will be held in the auditorium of the Museum of Natural History, Smithsonian Institution, Washington, D.C. on October 18, 1975. The meeting will begin at 10:00 A.M. and will end at 6:00 p.m.

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GREAT NEWS!

Your 1976 SSAR dues will remain the same! While most other societies have been forced to increase their dues, SSAR dues will remain the same through 1976.

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A N N O U N C E M E N T

The 1974 - SSAR Student Prize for the best student paper published in the Journal of Herpetology in 1974 was awarded to Eliezer Frankenberg of Hebrew University of Jerusalem for his paper, "Vocalization of males of three geographical forms of Ptyodactylus from Israel (Reptilia: Sauria: Gekkoninae)".

NEW ADDRESSES

Dr. Jeffrey Briggs
Dept. of Zoology
Univ. of Wisconsin-Milwaukee
Milwaukee, Wisconsin

Dr. J. W. Edward Wortham
Dept. of Zoology
Old Dominion University
Hampton Blvd.
Norfolk, Virginia 23508

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Dept. of Natural Sciences
Longwood College
Farmville, Virginia 23901

Leo G. Hoevers
Private Bag
Mumias, Kenya
AFRICA

CURRENT LITERATURE

NOTICE: The Current Literature project is now being handled by the Milwaukee Public Museum. All searchers: Please note the change in address.

As of July 1974, 59 searchers are scanning a total of 408 journals.

Searchers: As the titles will be published 4 times per year, try to send your titles in at least 4 times a year to have an approximately equal listing each issue in HR.

Due to lack of space in this issue, an updated list of journals is not included. Such an updated list is scheduled for next issue, budget permitting.

Any questions, comments, etc. should be sent to:

Max A. Nickerson
Current Literature
Vertebrate Division
Milwaukee Public Museum
Milwaukee, Wisconsin 53233

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RECENT DEATHS

On 2 August 1975 Dr. Roberto Donoso-Barros died in a tragic automobile accident in Concepcion, Chile. He was 53 years old. Dr. Donoso-Barros is best known among herpetologists for his "Reptiles de Chile" published in 1966 and for his coauthorship (with the late James A. Peters) of the volume on lizards in the "Catalogue of Neotropical Squamata" (1970). Dr. Donoso-Barros is survived by his wife and six children.

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Dr. Richard C. Bruce, Highlands Biological Station, will be responsible for amphibians and reptiles.

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In conjunction with the Virginia Herp. Soc. I am compiling a bibliographical account of the herpetofauna of that state. Tentative plans are to include this in a publication on the known distribution of the herps of Va. Reprints and publications with reference to any Va. herp are needed. Please send these to: JOSEPH C. MITCHELL, Dept. of Zoology, Arizona State University, Tempe, AZ 85281.

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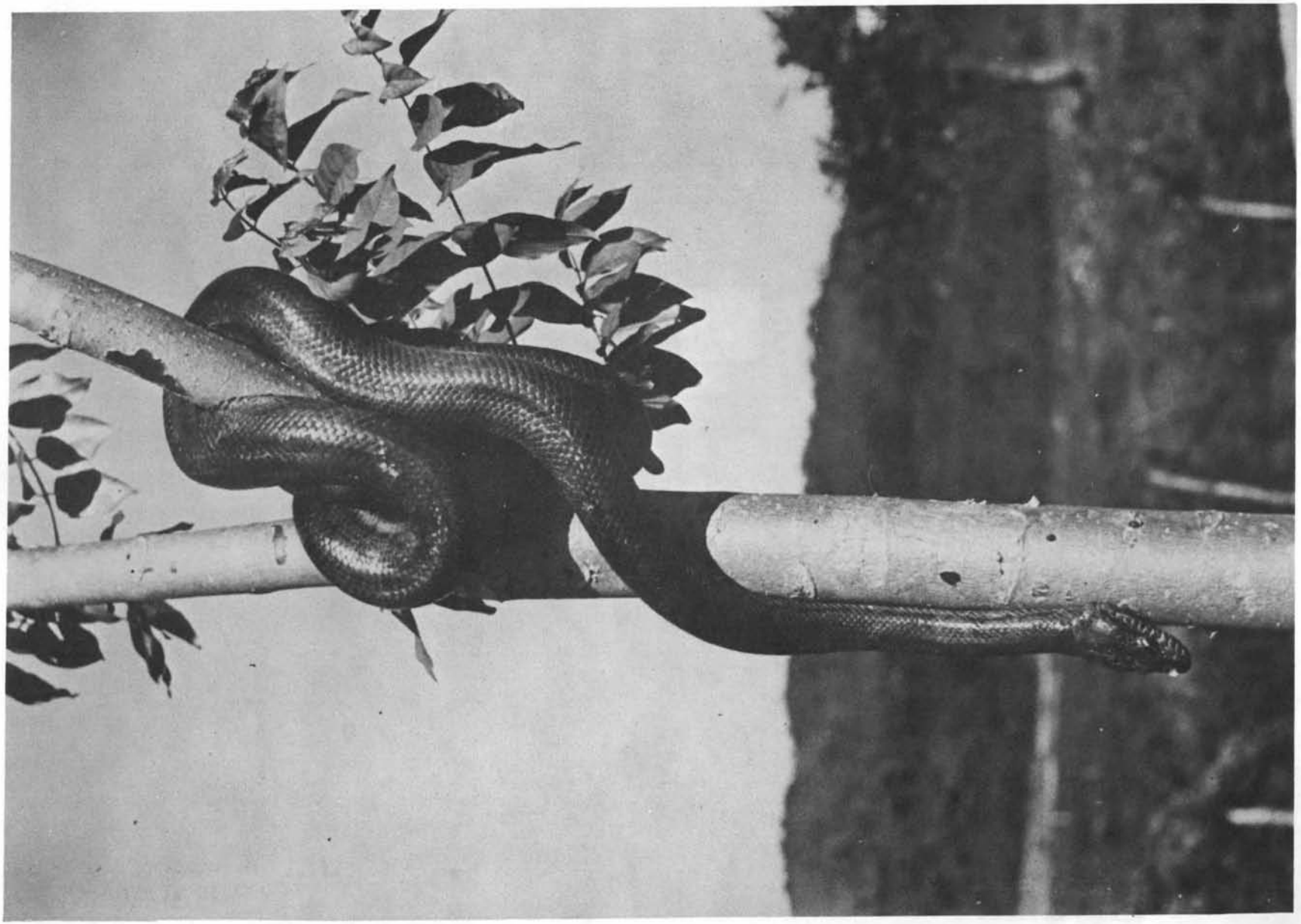
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Epicrates inornatus, the endangered Puerto Rican boa. This species is nearly extinct due to habitat destruction, persecution, and the mongoose. Photo Credit: U.S. Forest Service.



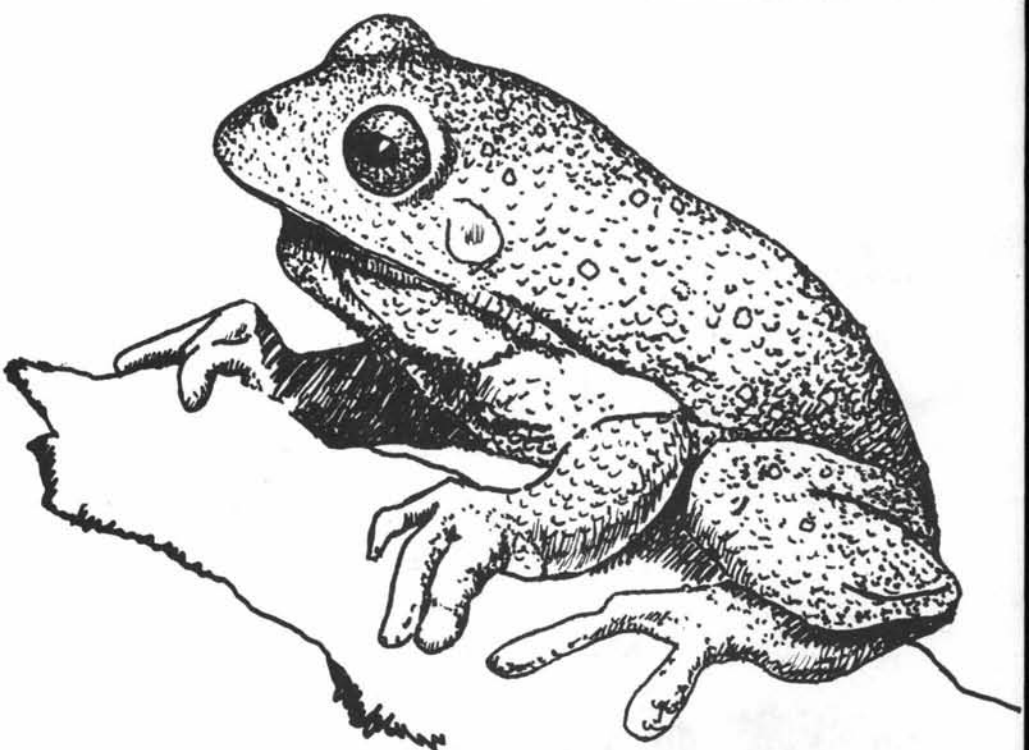
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CONTENTS

Recommendations for the Management of Herpetological Museum Collections..... 34

The Status of the Near-extinct Houston Toad (Bufo houstonensis) with Recommendations for its Conservation by Lauren E. Brown..... 37

Book Review - Snakes by Ruth B. Gross...George R. Zug..... 40

In the News..... 41

An Occurrence of Amphigonia Retardata in the White-lipped Viper, Trimeresurus albolabris by Gordon Henley..... 42

Ridley's Sea Turtle on the Coromandel Coast of India..... 42

Geographic Distribution..... 44

Neotropical Research News..... 45

Catalog of American Amphibians & Reptiles by Richard G. Zweifel..... 46

SSAR Student Prize..... 47

Colorado Herpetological Society..... 48

Book Review - Notes on the Herpetofauna of Surinam IV by M. S. Hoogmoed ... H. C. Seibert..... 50

Current Literature..... 51

Book Review - Guia de Los Anfibios Y Reptiles Espanoles by Alfredo Salvador... C. J. McCoy..... 62

Miscellanea..... 64

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RECOMMENDATIONS FOR THE MANAGEMENT OF HERPETOLOGICAL MUSEUM COLLECTIONS

Prepared by the
Committee on Resources in Herpetology[1]

One of the objectives of the Committee on Resources in Herpetology was to prepare a report which would include recommendations for effective use of the resource in the fulfillment of scientific and societal goals. The Committee's Final Report dealing with a variety of aspects of the resource in systematic herpetology was submitted in January 1975 to the National Science Foundation (which funded the Committee's activities) and to other sponsoring organizations[1]. The body of this report is to be published in Copeia and a summary of preserved collections of amphibians and reptiles in the United States will appear in the Circular Series of the SSAR. The present article, extracted from the Final Report, presents in outline form the Committee's basic recommendations for the management of herpetological museum collections and includes guidelines for rendering service to the scientific community and the general public.

Recommendations such as these are being prepared or have been prepared by a number of similar committees affiliated with the Association of Systematic Collections and acting under the auspices of discipline-oriented professional systematic societies.

A number of the recommendations that follow (marked with an asterisk) are essential for the operation of a well-managed museum collection of herpetological materials. Guidelines for management of living collections are similar to those listed here. These have recently been published for collections of amphibians[2], but no equivalent guidelines are yet available for collections of living reptiles.

I. Collection Management

*A. All specimens must be acquired in accordance with foreign and domestic laws, and should be deposited in institutional collections.

*B. An institution housing a herpetological collection must demonstrate a long-term commitment to the maintenance and service goals outlined herein.

1. Evidence of such a commitment is demonstrated by the institution providing at least one permanent professional curatorial position for overseeing the maintenance of the collection and providing for sufficient space, supplies, and equipment to attain the minimum goals of good collection management.

2. Institutions unwilling to assure a long-term commitment should actively seek a transfer of their collections to an institution willing to guarantee permanent collection care; the herpetological community should promote such transfers.

[1] A joint committee of the American Society of Ichthyologists and Herpetologists, the Herpetologists' League, the Society for the Study of Amphibians and Reptiles, and the Association of Systematic Collections. Members: David B. Wake (Chairman), Richard G. Zweifel (Vice Chairman), Herbert C. Dessauer, George W. Nace, Eric R. Pianka, George B. Rabb, Rodolfo Ruibal, John W. Wright and George R. Zug.

[2] Guidelines for the breeding, care, and management of laboratory animals: Amphibians. National Academy of Sciences, 1974. 153 p.

C. Standards for the preservation and maintenance of specimens.

*1. Each specimen (with some exceptions, e.g. series of larvae) should be individually tagged with a label giving at least a catalog number and identifier of the institution.

*2. The standard museum specimen should be fixed in a 10% formalin solution buffered to near neutrality following established procedures.

*3. Storage of specimens.

a. Standard museum specimens should be stored in 65-75% ethyl alcohol solutions, preferably in a cool, dark area with a stable temperature. Under special circumstances, a 60-70% isopropyl alcohol solution may be used as a substitute. Amphibian larvae should be stored in a buffered 10% formalin solution.

b. Histological preparations, tissue samples, sound tapes and other kinds of herpetological specimens should be preserved by tested methods which assure both long preservation and maximal usefulness.

*4. The curators must follow a regular program of specimen care (check alcohol levels, catalogue incoming material, etc.).

D. Specimen-related data.

*1. Minimum data.

a. Serial number and number of specimens included therein with their original numbers and current museum identifiers.

b. Scientific name.

c. Collection site: country, political subdivision, location to nearest town (as cited in original data books), and, if possible, elevation, latitude, longitude.

d. Collector and collecting date (preservation date, if different).

e. Reference to field notes or other data.

2. Elaboration of basic data, such as:

a. Nature and condition of specimen.

b. Its significance as voucher specimen and appropriate reference.

c. Sex, reproductive condition, ecological, and physiological parameters.

d. Type of associated material e.g., tissue type or karyotypic slides.

3. Maintenance of specimen files.

*a. Serial files (entries should be made in a machine readable form).

*b. Taxonomic file -- a hierarchical arrangement down to and including species. Computer print-out is desirable.

*c. Geographic files. Computer print-out is desirable.

d. Special files are useful for retrieval of data from accessory collections. In most instances these should be arranged taxonomically, at least.

II. Services Provided by Collections.

*A. High accessibility to qualified investigators.

1. Lending policy.

a. All reasonable requests for specimens and specimen related data should be honored.

b. Type specimens should be available for loan. Special conditions of transport, care, and duration of loan may be specified by the lending institution.

2. Research space and standard equipment should be provided for visiting investigators.

3. Library facilities available to curatorial staff and visitors should include the major journals, books, and reprints associated with the major area of coverage of the collection.

*B. Collection to serve as an active depository for the following items.

1. Specimens collected on federally supported projects.

2. Specimens documenting research and distributional data.

3. Collections receiving inadequate care, whether institutional or private (professionally trained curators have the responsibility of evaluating incoming collection for total or partial inclusion in their collection).

*C. Provide information service to investigators and the public.

1. Aid investigators in utilizing the collection, so that maximum data can be retrieved.

2. Provide the scientific and lay public with information on the identity and biology of amphibians and reptiles (this service must not be interpreted as requiring institutions or individual curators to supply, uncompensated, large blocks of data, such as those required for environmental impact statements).

3. To provide these services effectively and to care adequately for the collection, the curator should have direct control of a budget.

D. Communication system for rapidly relaying the latest information on curatorial methods, supplies, equipment, and services to interested parties.

The next meeting of the Eastern Seaboard Herpetological League will be in Washington, D.C. on the last Saturday of October, 1975 jointly sponsored by Washington Herpetological Society and Virignia Herpetological Society.

Stanley Dyrkacz in cooperation with Dr. Max Hensley (Michigan State University) is involved in an effort to record all recent occurrences of albinism in reptiles and amphibians. This new list will not repeat specimens previously recorded by Hensley (1959. Publ. Mus. Mich. State Univ. 1:135-159). Dyrkacz will appreciate hearing from anyone having specimens and/or photographs. Reprints on albinism and other information can be sent directly to: S. Dyrkacz, 3012 Walnut Drive, Wonder Lake, IL 60097.

THE STATUS OF THE NEAR-EXTINCT HOUSTON TOAD (BUFO HOUSTONENSIS) WITH RECOMMENDATIONS FOR ITS CONSERVATION

In the late 1940's and early 1950's the amateur herpetologist John C. Wottring and field companions collected a number of small, unique toads in the vicinity of Houston, Texas. Wottring was not sure of their specific identification and in his travels around the country he showed specimens to many herpetologists and played tapes of their mating calls which he had recorded. These herpetologists included Ottys Sanders of Dallas, who described the Houston toads as a new species (Bufo houstonensis) in 1953.

In ensuing years it became apparent that there were nine isolated populations of B. houstonensis in central and southeastern Texas (Brown, 1971, 1973). All population sizes appear quite low but a population in Bastrop County is somewhat larger and more extensively distributed (Brown, 1971). The species seems restricted to sandy areas often characterized by the presence of Loblolly Pine, Pinus taeda (Brown, 1971; Kennedy, 1962). W. F. Blair (1965) suggested that B. houstonensis originated as a relict of Bufo americanus after the latter withdrew northward at the close of the Wisconsin glaciation. Most workers consider B. houstonensis and B. americanus to be closely related and the two species were thought by A. P. Blair (1957) to be conspecific. Brown (1973), however, has shown that there are considerable differences in the mating calls (an important isolating mechanism in anurans) of the two species.

B. houstonensis was found to hybridize with Bufo valliceps and Bufo woodhousei in the Bastrop Co. population (Brown, 1971). B. houstonensis X B. valliceps natural hybrids are intermediate in morphology between the parental species but have an abnormal mating call that is usually not intermediate between the mating calls of the parental species. Since B. houstonensis and B. woodhousei are similar in morphology, it is difficult to distinguish their hybrids from either parental species. These hybrids, however, have mating and release calls that are intermediate between those of the parental species (Brown, 1971; Brown and Littlejohn, 1972). Natural hybrids were found at a total of four localities from 1-7 map miles apart in the Bastrop population. Habitat alteration by man appears to be the most probable cause of the natural hybridization (Brown, 1971).

From 1965-7 few or no B. houstonensis were found at most localities (Brown, 1971). The species is probably extinct or effectively extinct (because of extremely small numbers) at most localities with the exception of the Bastrop population. Bastrop choruses were still found in 1967, but there were probably no more than 300 B. houstonensis (possibly less than 100) in Bastrop Co. It is difficult to estimate population size because of the dispersed nature of the population and secretive habits of the toads. The Bastrop population is still extant and R. Martin (per. com.) found a chorus there in the spring of 1974. R. Thomas (per. comm.) also found a male at the Caldwell locality in the spring of 1974.

There are several possible causes of the trend toward extinction (Brown, 1971). Habitat destruction by man, particularly the elimination of sandy habitats, appears an important role. Because of small population sizes, B. houstonensis was entered as an Endangered Species in "Rare and Endangered Fish and Wildlife of the United States" (Peters, 1968). It is also listed in "Red Data Book Vol. 3 - Amphibia and Reptilia" (Honegger, 1970), "Threatened Wildlife of the U.S." (Office of Endangered Species and Int. Act., 1973), and the "U.S. List of Endangered Fauna" (Ibid., 1974). Additionally, the plight of the Houston Toad was publicized in Time magazine (Anonymous, 1969) and Newsweek magazine (Gwynne, 1975).

The Endangered Species Act of 1973 provides that "The Secretary of the Interior shall establish and implement a program to conserve (A) fish or wildlife which are listed as endangered species..." [Sec. 5. (a)]. In Jan. 1975 I wrote R. Skoog (Chief, Office of Endangered Species and Int. Act.) and asked what conservation plan they had in mind for B. houstonensis. Skoog indicated no plan existed but they hope to formulate one. Thus, in spite of publicity about the near-extinct status of B. houstonensis and the means for implementing a conservation program, no direct action has been taken toward the preservation of this species.

Since a mere toad lacks those esthetic qualities that make many of the endangered species of birds and mammals more appealing, it is unrealistic to assume that there will be extensive public support for establishing refuges for B. houstonensis. This is especially true since several of the populations are in or near Houston. Because of very small populations and proximity to metropolitan areas, I do not think it is feasible to attempt conservation in the vicinity of Houston. The Bastrop population would be the best place to direct conservation measures because: (1) the species is most numerous there; (2) the State of Texas owns land in the area (Bastrop and Buescher State Parks); (3) the habitat is far less disturbed than at other localities; (4) a large area of undisturbed land in Bastrop Co. is potentially available for a refuge; and (5) there are no metropolitan areas close to the population. However, this area is still subject to environmentally destructive activities. In the mid-1960's habitat alteration was mainly due to housing developments, road building and repair, agriculture, and activities carried out in conjunction with the state parks (clearing of land for camping, picnicing, golf courses, parking lots, construction of buildings, etc.). Presently there is increased danger from housing developments (W. James, per. com.) and the potentiality of lumbering (M. Peyton, per. com.).

I propose that a five-step plan be initiated to conserve B. houstonensis in Bastrop Co. The first step would be a publicity campaign to inform Texas residents about the near-extinct status of B. houstonensis. Erection of billboards at the entrances to the two state parks, distribution of pamphlets in the state parks and surrounding area, and newspaper and television publicity might prove effective in alerting the public and in curtailing further environmental destruction. Publicity could emphasize the appealing mating call of the Houston Toad (a long, high pitched trill - see Brown, 1971, 1973 for details). It resembles the tinkling of a small bell and is esthetically the most pleasing vocalization of all the toad species I have heard. The second step would involve use of zoning law to place all sandy habitats and land covered by pines in a Conservation District. Construction of buildings and roads, expansion of the state parks, clearing of land, and all other environmentally destructive activities could be prohibited in this zone. Violators could be subject to the penalties of the Endangered Species Act of 1973. The Secretary of the Interior could use the broad powers given to him by this Act to implement this zoning law. Alternately, the County Board of Bastrop Co. or the State of Texas could develop zoning laws. The Texas Hwy. Dept. appears ready to cooperate as they recently issued an environmental brief on B. houstonensis (McClure, 1974). This brief is used by district engineers in preparation of Environmental Impact Statements (R. Lewis, Tex. Hwy. Dept., per. com.). Because of the pines and scenic views in Bastrop Co., many Texas residents would probably go along with this type of zoning regulation. This approach has proven successful in preserving the wilderness area along the Mackinaw River in Woodford Co., Ill. (Zoning Commission of Woodford Co., 1962 et seq.). The third step would be acquisition of all sandy areas and land covered by pines for a refuge. Eminent domain could be used or land could be purchased as it becomes available. The

Endangered Species Act of 1973 encourages cooperation between the states and federal government for establishment of refuges and provides that money be appropriated for this purpose. The fourth step would be restoration of all environmentally disturbed land to an undisturbed condition. The fifth step would involve increasing the numbers of B. houstonensis through artificial fertilization of eggs in the laboratory (see Peters, 1968). Tadpoles could be raised through metamorphosis and young toads could be released at the Bastrop refuge. Laboratory propagation would reduce losses due to death in the susceptible pre-metamorphic stages. Implementation of all five steps would probably prevent extinction of B. houstonensis. If only the first two steps were carried out (involving expenditures of little money), the environmental situation would be held at status quo and the future of the Houston Toad would appear brighter.

Certainly some attempts are called for to save the Houston Toad. All species are worth conserving regardless of whether or not some species might be less pleasing to the eyes of some humans. It is doubtful that anything less than determined action can save the interesting Houston Toad from extinction. I am afraid that inactivity and quiet sympathy for this endangered toad's plight will only result in its extinction becoming a reality with the passage of time.

Acknowledgements: I thank W. James, R. Lewis, R. Martin, M. Peyton, R. Skoog and R. Thomas for providing information that aided the preparation of this ms., and J. Brown, R.S. Funk, D. Moll and J. Tucker for critically reading the ms. This paper was modified and expanded from a report ("Status of the Houston Toad, Bufo houstonensis Sanders" by L.E. Brown) prepared for The Texas Organization for Endangered Species in Jan. 1974.

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Lauren E. Brown
Department of Biological Sciences
Illinois State University
Normal, Illinois 61761

SNAKES. Ruth B. Gross. 1975. Four Winds Press, 58 p. Snakes, snakes, and more snakes. This book tells the elementary and junior-high school set all they want to know about snakes and then some more. The writing style is aimed at the young reader and maintains a pleasant and interesting flow of facts and ideas. The test is supplemented by numerous, good to excellent b/w and color photographs - 40 plus. Baby snakes, shedding, capturing and eating prey, enemies, locomotion, and keeping warm are the major topics of snake biology that are discussed. A section on types of snakes - nonpoisonous and poisonous, US and Canadian species and other snakes of the world - are illustrated in color, each with a short paragraph on habits and distribution. This book is highly recommended and will hopefully appear in many elementary school libraries. The book appeared in paperback and a different format in 1973 (Scholastic Book Service). Text and photographs remain the same in this new edition, but the larger page size, glossy paper, and new format add to its attractiveness.

George R. Zug
Division of Reptiles and Amphibians
National Museum of Natural History

ASSISTANT CURATOR IN HERPETOLOGY OR ICHTHYOLOGY to start 1 January 1976. Appointment at half-time for 12 months, emphasizing recent or fossil taxa; duties chiefly in collection management but include research and graduate student guidance. Ph.D. required. Send C.V. and 3 letters of reference to R.F. Johnston, Museum of Natural History, The University of Kansas, Lawrence, KS 66045. K.U. is an Equal Opportunity Employer, encouraging applications by qualified persons of all races.

IN THE NEWS

The remains of a missing hunter were recovered from the body of a 19-foot salt water crocodile at Weipa, 1200 miles north of Brisbane, Australia. According to police, the hunter was swallowed while taking a nap during a hunting and fishing trip.

UPI In Milwaukee Sentinel
29 April 1975

Medical scientists at the University of Michigan have found, with the use of lizards, that "A burning fever may be the body's way of killing bacteria". Lizards exposed to fever-causing bacteria survived significantly more often if their body temperature was maintained at 40-42 C for 24 hours.

Science News
12 April 1975

The Humane Society has urged the government "to ban disease-carrying pet turtles before millions more are hatched next month".

The government at one time estimated that turtles were responsible for 280,000 cases of Salmonellosis each year in the United States.

UPI In Milwaukee Journal
3 May 1975

In Avalon, New Jersey there are road signs reading "Caution Turtle X-ing". Turtles "are protected by state law which makes it a crime to mess with a turtle in any way between April and November".

Women Sports
May 1975

Two hundred and seventy-five green sea turtles were released at Cape Florida State Park by the Miami Seaquarium. The seven-month old turtles are part of a project, undertaken with the Florida Department of Natural Resources, to repopulate the Florida coast with giant green turtles. Each of the turtles was individually marked with a tag. Turtles released in the past from Cape Florida have turned up as far south as Venezuela and as far north as New York City. It is hoped that when the turtles mature they will return to Cape Florida Beach to lay their eggs.

UPI In Milwaukee Journal
28 April 1975

Australian authorities have made progress in cracking a ring of smugglers who are illegally sending Australian reptiles to Europe and the United States Australian snakes are bringing up to $6.50 per inch on foreign black markets. In the past two months South Australian officials have seized more than 40 reptiles in packages destined for overseas.

AP In Milwaukee Journal
8 June 1975

Among species added to the U.S. Interior Department's list of endangered species is the American crocodile.

UPI In Milwaukee Journal
4 May 1975

Apparently gourmet food shops are having difficulty in getting rattlesnake meat. However, head of the cattle raisers association in Colombia, South America said they are quite willing to send snake meat instead of beef to the U.S. since they have unlimited quantities.

San Francisco Chronicle
11 May 1975

AN OCCURRENCE OF AMPHIGONIA RETARDATA IN THE WHITE-LIPPED VIPER, TRIMERESURUS ALBOLABRIS

Amphigonia retardata has been noted in various species of reptiles. Viable sperm stored by females may last for 6 years in the snake Leptodeira annulata polysticta (Porter, 1972).

Stewart (1972) reports sperm storage in Thamnophis couchi hammondi and summarizes the references of this phenomenon pertaining primarily to Thamnophis. Nickerson (1974) lists an occurrence of amphigonia retardata in Trimeresurus popeorum. However, information regarding sperm storage in other species of Trimeresurus is apparently lacking.

In April 1971, I received a single, adult female white-lipped viper, Trimeresurus albolabris, 50cm in length, with the posterior one-third of its body swollen and appearing injured. It was maintained in complete isolation.

On 13 June 1971 she gave birth to two young, one deformed but alive (died within a week), and one normally developed but dead. Four undeveloped eggs were also present.

One 30 June 1972 she gave birth to eight living young. No undeveloped eggs were noted, however, the left eyes of four of the young were incompletely developed. Otherwise, all were healthy, struck vigorously when threatened and fed well on Blanchard's cricket frogs, Acris crepitans blanchardi.

LITERATURE CITED

Nickerson, M. A., 1974, "Comments on the reproduction of Pope's pit viper (Trimeresurus popeorum) Smith", Brit. J. of Herp. 5(3):451-452.

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Gordon Henley
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RIDLEY'S SEA TURTLE ON THE COROMANDEL COAST OF INDIA

A survey of the status of Ridley's sea turtle (Lepidochelys olivacea) on India's Coromandel Coast was made between 10 December 1973 and 15 March 1974.

Because Lepidochelys is considered a "god" by the coastal fishermen, it has a good chance for survival. Apparently the turtles and their eggs are not harvested unless fish are scarce. Even then, they take only what they need. Unfortunately, however, non-fishermen exploit the turtles and "collect and sell them [the eggs] by the thousands".

The nests of Lepidochelys are predated upon by jackals, dogs and man, with jackals apparently taking the highest toll.

The Madras Snake Park hopes to establish a "Croc Bank" for the breeding and perpetuation of India's endangered crocodilians. Two and one-half acres of beach land have been purchased for this project and it is hoped that the site will also become a turtle research centre. Unfortunately, lack of funds has postponed the initiation of either project.

Excerpted from:

"Olive Ridleys on the Coromandel Coast" by S. Valliappan and Romulus Whitaker (Madras Snake Park, Madras, INDIA 600022)

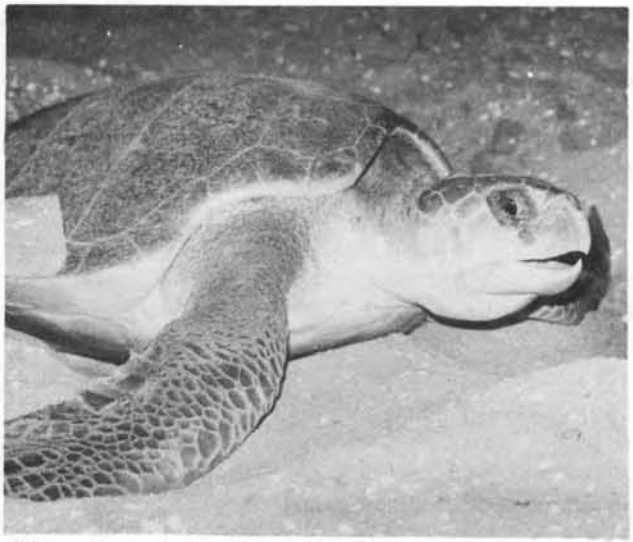


Fig. 1. A laying female Ridleys gulping air.

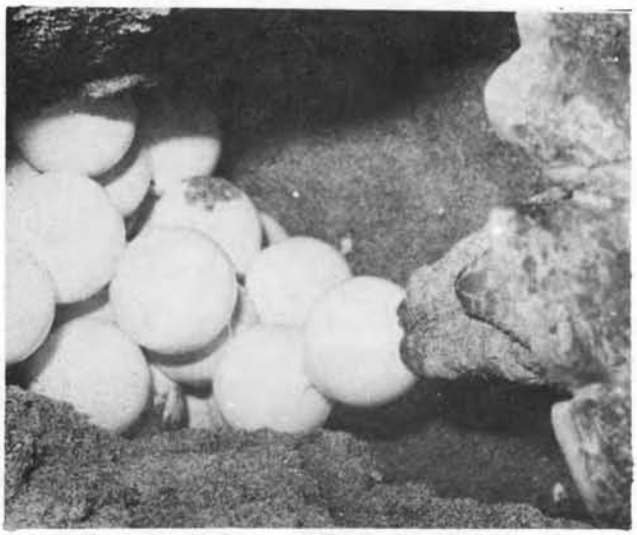


Fig. 2. Ridleys turtle in the process of laying - note distended cloaca.



Fig. 3. What remains after the jackals dig up a nest.



Fig. 4. A hatchling Ridleys.

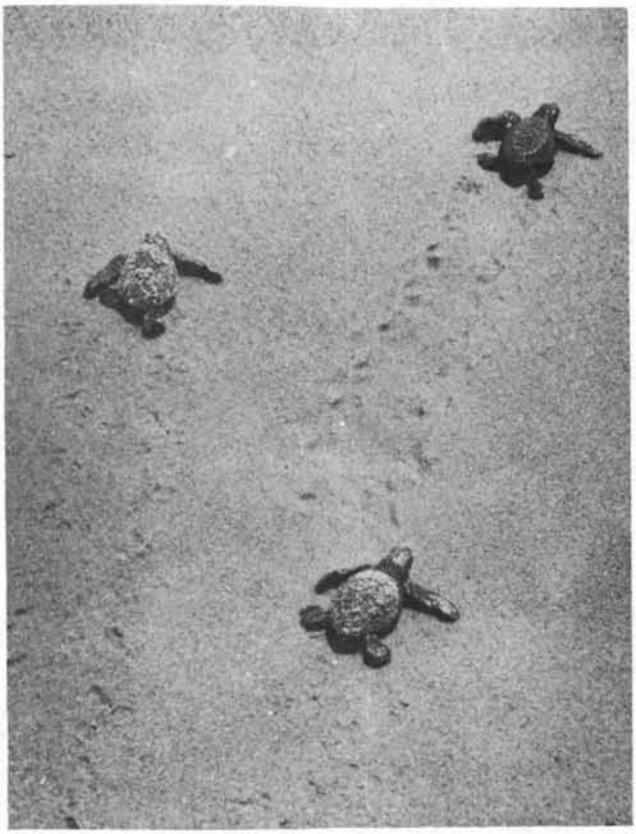


Fig. 5. The race to the sea.

GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW publishes brief notices of new geographical records in order to make them available to workers in published form. The STANDARD FORMAT for a record is:

SCIENTIFIC NAME (Common name). Locality (air-line distance to nearest town); date; collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY. address.

Please submit new records in STANDARD FORMAT (short manuscripts are acceptable when data cannot be adequately presented in standard format) to Joseph C. Mitchell, Dept. of Zoology, Arizona State University, Tempe, Arizona 85281.

Recommended citation: Jones, J. 1974. Geographic Distribution: Rana pipiens. Herp. Rev. 5(1):1.

TESTUDINES

DEIROCHELYS RETICULARIA MIARIA (Western chicken turtle). U.S.A., Oklahoma, Pattawatomie Co., 1.5 km SW Shawnee ; 10 May 1974; Jeffery H. Black. U. Oklahoma Museum, uncatalogued. New county record on northwest margin of range. Submitted by JEFFERY H. BLACK, Dept. of Biology, Oklahoma Baptist University, Shawnee, OKLA 74801.

KINOSTERNON SUBRUBRUM HIPPOCREPIS (Mississippi mud turtle). U.S.A., Oklahoma, Seminole Co., 7 km S Maude; 3 June 1974; Jeffery H. Black. U. Oklahoma Museum, uncatalogued. First record for county and extends range 48 km NW of previous northwestern most locality in Hughes Co. (Webb, 1970 , Reptiles of Oklahoma, U. Oklahoma Press). Submitted by JEFFERY H. BLACK.

STERNOTHERUS CARINATUS (Razor-backed musk turtle). U.S.A., Oklahoma , Seminole Co., 7 km S Maude; 17 May 1974; Roger Simpson. Jeffery H. Black. U. Oklahoma Museum, uncatalogued. Extends range 64 km N of previous western most record in Johnston Co. (Webb, 1970, Reptiles of Oklahoma, U. Oklahoma Press). Submitted by JEFFERY H. BLACK.

TERRAPENE CAROLINA TRIUNGUIS (Three-toed box turtle). U.S.A., Oklahoma, Garfield Co., 10.2 km SE Enid; 18 May 1974; 6.5 km S Covington; 8 Sept. 1974; R.L. Lardie. Collection of R.L. Lardie, alive and RLL 822, respectively. Extends range ca. 44 km NW of nearest Oklahoma records and connects a single most westerly record from Great Salt Plains Refuge, Alfalfa Co. (Webb, 1970, Reptiles of Oklahoma, U. Oklahoma Press). Associated species not previously reported from Garfield Co. are: Chrysemys scripta elegans (RLL 903), Eumeces fasciatus (RLL 874, 917, 921), Lygosoma laterale (RLL 909), Crotalus horridus (Collection of Kline farm), Diadophis punctatus aryni (RLL 922, 924, 928-9), Masticophis flagellum x testaceus (RLL 849, 876), Opheodrys aestivus majalis (RLL 875). Submitted by RICHARD L. LARDIE, Dept. of Biological Sciences, Oklahoma State University, Stillwater, OKLA 74074.

SAURIA

EUMECES MULTIVIRGATUS MULTIVIRGATUS (Many-lined skink). U.S.A., Nebraska, Greeley Co., 8 km W-NW Greeley; 3 July 1971; S.M. Moody and D.C. Moody. S.M. Moody and A.E. Greer. Harvard University, MCZ 128356. First record for county. Establishes intermediate locality between the northeastern most (Holt Co.) and southeastern most (Kearney Co.) previously known localities. Extends range 160 km east of previous known locality (Logan Co.) representing the central portion of range in Nebraska. Greeley Co. borders the southeastern most portion of the Sandhill-short grass prairie, characteristic habitat for this species. Submitted by SCOTT M. MOODY, Museum of Zoology, University of Michigan, Ann Arbor, MICH 48104.

GERRHONOTUS PANAMINTINUS (Panamint alligator lizard). U.S.A., California, Inyo Co., 13.7-15.8 km NE Big Pine; 24 June 1974; J.D. Dixon, Univ. of California, Berkeley, Mus. of Vertebrate Zoology, UCB 94720 (3). AOR specimens found between 2110 and 2140h suggest previously unrecorded nocturnal Activity. Extends known range into the White Mts., 74.1 km from previous northern locality, and increases altitudinal record from 1553 to 2072 meters (Banta, 1963, Occ. Papers Calif. Acad. Sci., (36): 1-12). Submitted by JAMES D. DIXON, 2326 Russell St., Berkeley, CA 94705.

SERPENTES

CEMOPHORA COCCINEA COPEI (Scarlet snake). U.S.A., Oklahoma, Johnston Co., Tishomingo National Wildlife Refuge, Public Game Management Area, 6.4 km S Tishomingo; 30 June 1974; R. L. Ball, Univ. Oklahoma Mus., uncatalogued. Extends Oklahoma range 113 km SW of nearest previous record on Seminole - Hughes Co. line (Webb, 1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Submitted by ROBERT L. BALL, Dept. of Zoology, University of Oklahoma, Norman, OKLA 73069.

COLUBER CONSTRICTOR LATRUNCULUS (Black-masked racer). U.S.A., Mississippi, Washington Co., 8.8 km W Hollandale (T 15 N, R 7 W, Section 5); 20 July 1968, 28 May 1972, 2 June 1973. J.W. Cliburn. Univ. Southern Mississippi Dept. of Biology Collections, USM 74-1, 74-2 and not retained, respectively. First Mississippi records and most northerly location. Issaquena Co., 0.5 km W Mayersville (T 12 N, R 8 W, Section 3); 17 July 1972; D. Robinson. J.W. Cliburn. Univ. Southern Mississippi Dept. of Biology Collections, USM 74-3. First county record. Submitted by J. WILLIAM CLIBURN, Dept. of Biology, University of Southern Mississippi, Hattiesburg, MISS 39401.

SISTRURUS MILIARIUS STRECKERI (Western pigmy rattlesnake). U.S.A., Oklahoma, Pottawatomie Co., 6.4 km W Tribbey, 2 Aug. 1973; 2.4 km W Tribbey, 3 Aug. 1973; 3.2 km NE Tribbey, 5 Aug. 1973; 4.8 km W Tribbey, 5 Aug. 1973; 9.7 km W Tribbey, 6 Aug. 1973; 3.2 km E Macomb, 14 Sept. 1973; R.L. Ball. Univ. Oklahoma Mus. of Zoology, uncatalogued. Established county record on NW margin of range (Webb, 1970, Reptiles of Oklahoma, Univ. of Oklahoma Press). Submitted by ROBERT L. BALL.

TANTILLA NIGRICEPS NIGRICEPS (Plains black-headed snake). U.S.A., Oklahoma, Garfield Co., 9.5 km E Bison; 4 May 1974; 24 May 1974 (2); R.L. Lardie, Collection of R.L. Lardie, RLL 1085, 1034-5, respectively. Extends range 101 km NE of nearest previous record in Dewey Co. and 102 km SE of a record in Woods Co. (Webb, 1970, Reptiles of Oklahoma, Univ. Oklahoma Press). Associated species not previously recorded for Garfield Co. are: Crotaphytus collaris collaris (RLL 1071); Holbrookia maculata maculata x perspicua (RLL 1072-4), Lampropeltis getulus holbrooki (RLL 1037), Sonora episcopa episcopa (RLL 1015 - 33), Thamnophis sirtalis parietalis (RLL 1088). Submitted by RICHARD L. LARDIE. Dept. of Biological Sciences, Oklahoma State University, OKLA 74074.

THAMNOPHIS ELEGANS VAGRANS (Wandering garter snake). U.S.A., Colorado, Elbert Co., 13 km W Limon; 16 July 1973; J.E. Gillis. J.R. Scott. Not preserved. An approximate 64 km eastward extension and a new county record. Submitted by JOHN E. GILLIS, Dept. of Zoology-Entomology, Colorado State University, Fort Collins, COLO 80523.

NEOTROPICAL RESEARCH NEWS

JAIME VILLA (Cornell University) will be spending this next year in Central America and Mexico, studying the symbiosis between unhatched tree-frogs and parasite-like flies. He will also be Visiting Professor at the Universidad Nacional Autonoma, Nicaragua.

CATALOG OF AMERICAN AMPHIBIANS AND REPTILES

As of the date of this publication, 163 numbers of the Catalogue have been issued. A large proportion of the species living north of Mexico have been assigned to authors, but there still remain many species unassigned. Species for which we do not have authors are these:

SALAMANDERS: *Desmognathus fuscus, Ensatina eschscholtzii.*

FROGS: *Acris gryllus, Bufo americanus, B. debilis, B. marinus, B. microscaphus, B. punctatus, B. quercicus, B. terrestris, Hyla arenicolor, H. cadaverina, H. chrysoscelis, H. regilla, H. versicolor, H. wrightorum, Limnaoedus ocularis, Pseudacris clarki, P. nigrita, P. ornata, P. triseriata, Rana berlandieri, Scaphiopus intermontanus.*

CROCODILIANS: *Crocodylus acutus.*

TURTLES: *Caretta caretta, Eretmochelys imbricata, Kinosternon flavescens, K. hirtipes, Lepidochelys olivacea, Sternotherus carinatus, S. minor, Terrapene ornata, T. carolina.*

LIZARDS: *Anolis carolinensis, Callisaurus draconoides, Cnemidophorus burti, C. dixoni, C. exsanguis, C. flagellicaudus, C. gularis, C. inornatus, C. laredoensis, C. scalaris, C. sonorae, C. tesselatus, C. velox, Cophosaurus texanus, Crotaphytus collaris, C. insularis, Dipsosaurus dorsalis, Eumeces anthracinus, E. gilberti, E. septentrionalis, Gonatodes albogularis, Leiocephalus carinatus, Phrynosoma cornutum, P. coronatum, P. douglassii, Sceloporus cyanogenys, S. graciosus, S. grammicus, S. jarrovii, S. magister, S. poinsetti, S. scalaris, S. undulatus, S. variabilis, Urosaurus microscatatus, U. ornatus, Uta stansburiana.*

SNAKES: *Chilomeniscus cinctus, Chionactis occipitalis, C. palarostris, Coniophanes imperialis, Contia tenuis, Crotalus atrox, C. cerastes, C. horridus, C. mitchelli, C. molossus, C. ruber, C. scutulatus, C. tigris, C. viridis, Diadophis punctatus, Farancia abacura, F. erythrogrammus, Heterodon nasicus, H. platyrhinos, H. simus, Hypsiglena torquata, Lichanura trivirgata, Masticophis bilineatus, M. lateralis, M. taeniatus, Opheodrys aestivus, O. vernalis, Pituophis melanoleucus, Regina alleni, R. grahamii, R. septemvittata, Salvadora deserticola, S. hexalepis, Sistrurus catenatus, Sonora episcopa, S. semiannulata, Storeria dekayi, S. occipitomaculata, Tantilla coronata, T. cucullata, T. nigriceps, T. rubra, T. wilcoxi, Thamnophis butleri, T. couchii, T. cyrtopsis, T. elegans, T. eques, T. ordinoides, T. radix, T. rufipunctatus, T. sirtalis.*

****

We invite anyone wishing to volunteer to produce a Catalogue account of one of these species to contact the appropriate Section Editor: SALAMANDERS--Dr. J.D. Anderson, Dept. of Zoology, Rutgers State Univ., Newark, NJ 07102; FROGS--Dr. R.G. Zweifel, Dept. of Herpetology, American Museum of Natural History, Central Park West at 79th St., New York, NY10024; CROCODILIANS--Dr. H. Campbell , National Fish and Wildlife Lab., 2820 E. University Ave., Gainesville, FL 32601; TURTLES--Dr. G. Zug, Division of Reptiles/Amphibians, National Museum of Natural History, Washington, DC 20560; LIZARDS--Dr. C. J. McCoy, Dept. of Herpetology, Carnegie Museum, Pittsburgh, PA 15213; SNAKES--Dr. L.D. Wilson, Division of Intercurricular Studies, Miami-Dade Community College, South Campus, 11011 S.W. 104th St., Miami, FL 33156.

The Section Editors also will welcome volunteers for generic accounts.

The scope of the Catalogue extends southward beyond the International Boundary. Authors who may wish to write accounts of species in the Caribbean, Mexican or Central American regions are urged to contact a Section Editor.

Richard G. Zweifel, Gen. Ed.

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES



PRIZE FOR BEST STUDENT JOURNAL PAPER

An annual prize of $100 was established in 1973 to be awarded to that student publishing the most significant paper in the *Journal of Herpetology* during the preceding year. This award is to serve a dual purpose: (i) to recognize the important, original contributions made to our knowledge of amphibian and reptile biology by young persons; and (ii) to encourage students to publish in *Journal of Herpetology*. Unlike awards for oral presentations, which require the presence of the person at a particular meeting site in order to compete, this prize is open to all students throughout the world and thus is more fitting for a society having an international focus.

COMMITTEE

1. An *ad hoc* Prize Committee of five persons will be appointed by the Society Chairman early each year.
2. The Committee should be international in composition. Since Committee members will need to have the relevant *Journal* issues at hand, this should be noted in appointing non-American members.

ELIGIBILITY

1. A person must have been a student at an accredited school (elementary, secondary or university level) within one year of submitting the manuscript for publication. Submission dates can be verified by the Editor of the *Journal*.
2. The Committee Chairman should designate all articles to be considered. This list should be all-inclusive, even including those articles where author eligibility is possibly in doubt. After the vote, the highest-ranking, eligible person can be identified.

CRITERIA

1. The prize should be awarded to that person reporting the most significant new contribution to our knowledge of amphibian or reptile biology, interpreted in its broadest sense.
2. If the Committee so chooses, "no winner" may be declared.

AWARD

1. The Committee's decision should be reported to the Society's Chairman and Treasurer by June 1.
2. The Society Chairman will notify the awardee as soon as possible.
3. The award will be presented at that summer's Annual Meeting; it is hoped that the student will be present to accept the award.

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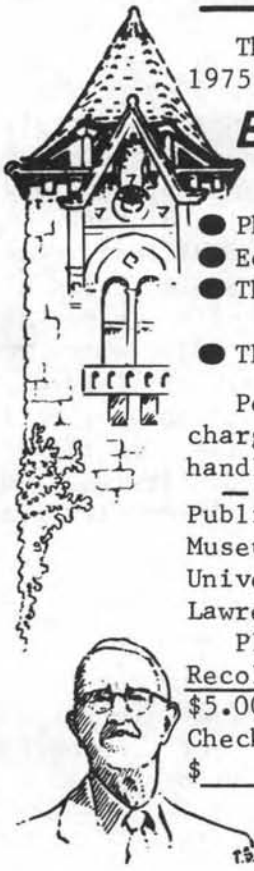
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BOOK REVIEW

NOTES ON THE HERPETOFAUNA OF SURINAM IV. THE LIZARDS AND AMPHISBAENIANS OF SURINAM. 1973. M. S. Hoogmoed. X + 420 pp., 81 figs., 42 photographs, 30 tables, Dr. W. Junk, publisher.

This text is destined to become the definitive reference to the lizards and amphisbaenians of Surinam and of adjacent areas. Four families of lizards, comprising 7 species of geckos, 12 iguanids, 1 scincid, and 20 teiids, plus 3 species of amphisbaenians are discussed and described in exquisite detail. Each account includes photographs of the whole animal, from different aspects, and detailed drawings of the scalation. Keys to the families, genera, and species are provided. The distribution of each species is plotted and all the specimens examined (from world-wide depositories) are listed with tabular scale counts. Following the descriptive diagnosis, there are data on the known habits and natural history of the reptile. Ranges outside Surinam are delimited.

The taxonomist will find 2 new subspecies described. Three completely and one partially unisexual species of lizard are signalized. The introductory chapter provides a concise history of the collectors and expeditions for lizards in Surinam plus a discussion of faunal relationships with especial comparison to Parker's 1935 work on Guyana (= British Guiana) lizards. There is a complete bibliography and index. This book is a must for biogeographers, students of lizards, and for those who are just interested in Surinam.

-- H. C. Seibert, Dept. of Zoology , Ohio University, Athens, Ohio 45701.

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Due to lack of space in this issue, an updated list of journals is not included. Such an updated list is scheduled for next issue, budget permitting.

Any questions, comments, etc. should be sent to:

Max A. Nickerson
Current Literature
Vertebrate Division
Milwaukee Public Museum
Milwaukee, Wisconsin 53233

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GUIA DE LOS ANFIBIOS Y REPTILES ESPANOLES. By Alfredo Salvador. 282 p. Publication of the Instituto Nacional para la Conservacion de la Naturaleza, Ministerio de Agricultura. Available from Estacion Central de Ecologia ICONA, Carretera de la Coruna Km. 7, Madrid 35, Spain. Price 500 Ptas. (= $9.00).

No publication form in herpetology stimulates greater interest than a well-executed field guide. Tantalizingly terse summaries of life histories demand further study, range maps challenge the collector to verify or add to them, and a comprehensive set of illustrations satisfies the innate need to grasp natural diversity. In my own case the stimulus was Schmidt and Davis' "Field Book of Snakes," and later generations have been impelled by the Conant and Stebbins guides in the Peterson series. Compared with these volumes, classics of their kind, Alfredo Salvador's "Guide to Spanish Amphibians and Reptiles" holds its own.

The guide treats 73 species of amphibians and reptiles occurring on the Iberian Peninsula, the Balearic Islands, and the Canary Islands. Each species account includes a diagnostic description, size data, a succinct summary of the major aspects of biology of the species, and a review of the distribution. The descriptions and the biological data are more elaborate and inclusive than usually found in a field guide, and provide an excellent introduction to each species. For example, such details of life history as size and number of eggs, and length of larval life are given for the amphibians. A shaded range map is inserted in the account of each species, saving a lot of thumbing to another part of the book.

Color plates depicting all species are interleaved with the species accounts. The illustrations are not the diagnostic drawings usually found in a field guide, but more on the order of portraits of the species. They are superbly executed, and undeniably attractive, but vary in effectiveness as identification tools. Appended to the species accounts is a systematic catalog of the fauna, including subspecies, with synonymies for all forms. Salvador has annotated this catalog with pertinent comments on geographic variation and taxonomic problems in various species. For anyone who has wrestled with the fragmented literature of Balearic Lacerta this section alone is worth the price of the book.

Other departures from customary field guide format are a discussion of the zoogeography of the Iberian fauna, and a key to the species. The section on zoogeography, necessarily short, suffers because of its brevity. The keys are well-illustrated with line drawings, and appear to be based on easily determined characters. As a further fillip, there is a short review of the general biology of amphibians and reptiles preceeding the species accounts of each group.

It is difficult to find fault with this guide. The distribution maps would have been more effective with provincial boundaries included, and a section on physical and political geography of the Iberian Peninsula is needed. But these are minor and essentially personal criticisms. Alfredo Salvador can take pride in this beautifully realized work, the only modern field guide to any segment of the European herpetofauna.

C. J. McCoy
Carnegie Museum of Natural History
Pittsburgh, PA 15235

Robert W. Henderson (Vertebrate Division, Milwaukee Public Museum, Milwaukee, WI 53233) would like to obtain live individuals of the snake genus Scaphiodontophis with or without locality data.

WANTED

Specimens or information leading to the acquisition or examination of specimens of flies, gnats and other insects which parasitize or feed on eggs or unhatched tadpoles of frogs, or other amphibians. Write to JAIME VILLA, Section of Neurobiology & Behavior, Cornell University. Langmuir Laboratory, Ithaca, New York 14853. After 1 June write air mail to field address: Apartado Postal 427 Managua, Nicaragua, Central America.

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If you know of publications or evidence indicating the impact of the "pet trade" on natural amphibian and reptile populations or evidence which shows that breeding of rare species in captivity has improved the status of wild populations, following the release of captive bred specimens, contact:

Dr. Ian F. Spellerberg
Dept. of Biology
Bassett Crescent East
Southampton, S093TU
ENGLAND

or

Dr. Max A. Nickerson
Head - Vertebrate Division
Milwaukee Public Museum
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The Missouri Prairie Foundation (P.O. Box 200, Columbia, Missouri 65201) is actively engaged in prairie conservation. Since 1966 four areas of virgin tall grass prairie totaling 557 acres have been preserved. These areas, in the tall grass prairie - deciduous forest tension zone, are managed to retain their grassland characteristics. The MPF is now trying to expand its holdings to include remnants of short grass prairies located on the loess hills along the Missouri River. These tall grass and short grass prairie preserves provide suitable habitats for a number of herptiles typical of the central United States. Contributions to the Missouri Prairie Foundation (regular membership $5 and above; student membership $3) would aid in expanding this effort. Biologists are encouraged to use these areas for approved scientific studies.

O. J. Sexton
President, MPF

The last complete sets of A Statistical Study of the Rattlesnakes (5 papers totaling 255 pages) by L.M. Klauber are available from the San Diego Natural History Museum for $2.50 postpaid. These papers were published between 1935-1940 as Occas. Papers of the San Diego Soc. Nat. Hist. and were one important base on which Klauber's definitive work concerning Rattlesnakes was written. Address orders to:

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Clifford H. Pope's set of Herpetologica (complete through 1974 except 4(5), 6(3) and 14(4) is available to the highest bidder (bidder pays postage). Contact:

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The agenda is now being prepared for the Board meeting to be held in conjunction with the SSAR Annual Meeting 11-14 August 1975 in Fullerton, California.

If you have any concerns or topics that are appropriate, and would like the Board to consider them, please submit your request in writing no later than July 25 to:

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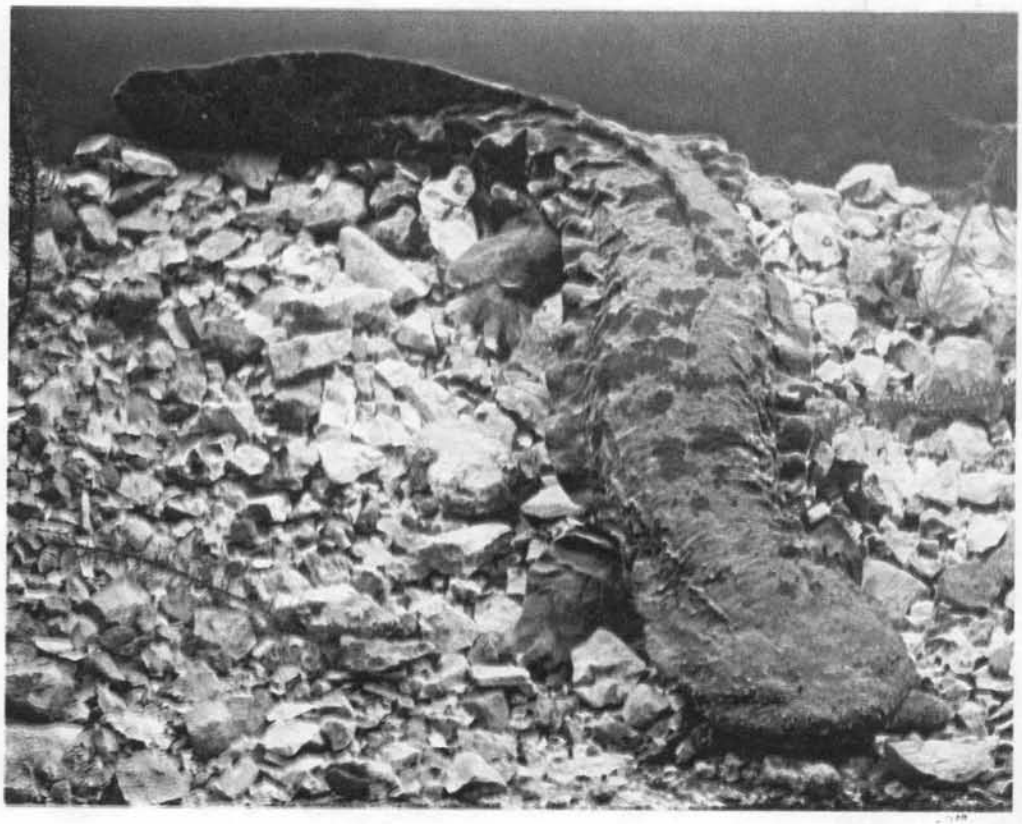
INSIDE BACK COVER

Houston Toad, Bufo houstonensis. Photo: Robert A. Thomas, Texas A & M University, College Station, Texas.

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MARCH, 1975
VOLUME 6, NUMBER 1



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Herpetological Review

VOLUME 6, NUMBER 1

MARCH, 1975

CONTENTS

NEWS & COMMENT

2 Status and Conservation of the Gharial (Gavialis gangeticus) provided by Romulus Whitaker

4 New Publications

5 Neotropical News

6 In The News

7 Conservation News

8 SSAR Membership - Proposed Amendment

ARTICLES

9 Anomalies in Adult Bufo arunco and Larval Calyptocephalella caudiverbera by Alfredo Salibian and Jorge Cabrera

10 The Second Recorded Occurrence of an Albino Thamnophis radix radix (Baird & Girard) by Stanley Dyrkacz

11 More Herpetological Type-specimen Lists by C. J. McCoy

12 Marking Anurans with Silver Nitrate by Allen E. Thomas

13 Freeze-drying Anuran Tadpoles for Taxonomic Examinations by Ronald Altig

13 A Method of Observing Movements of Aquatic Turtles by Warren Davis, Jr., and George Sartor

14 Book Review - Reassessment of Muscle Homologies and Nomenclature by Aselaid Forst Ellsworth... Stanley Dyrkacz

15 A Laboratory Thermal Gradient by Ben E. Dial

17 Herpetology at Texas A & M University

18 A Method for Force-Feeding Snakes by Charles W. Radcliffe

18 Book Review - Husbandry, Medicine and Surgery in Captive Reptiles by Fredric L. Frye... J. P. Kennedy

20 Life History

21 Geographical Distribution

22 Clifford Hillhouse Pope (Obituary) by Charles M. Bogert

27 Carl Frederick Kauffeld (Obituary) by Roger Conant

29 Current Titles

FRONT COVER: Ozark Hellbender, Cryptobranchus alleganiensis
Photograph: Jan Mahlberg, MPM

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STATUS AND CONSERVATION OF THE GHARIAL (Gavialis gangeticus)

During three months of the period from October 1973 to May 1974, members of the Madras Snake Park Trust and Conservation Centre covered approximately 5,000 kms. in the range of the gharial interviewing local people and making field investigations. During this period a total of only six wild gharial were seen by us.

Shri Ranjitsinh, Deputy Secretary to Government (Wildlife), refers to the gharial as one of the five most endangered Indian animals. Killing for its skin is the most important reason for the rapid decline in numbers, and at present fishermen with nets are a very serious threat. The skin of a 12' animal may bring in Rs. 800 (U.S. $104.00) which represents at least half a year's Indian wages.

The increase in river activity by way of fishing, transport and agriculture has limited Gavialis gangeticus habitat to a very few remaining wild areas. Major alteration of rivers by earthquakes, dams, canal diversions, artificial embankments and increased siltation through erosion are other reasons for the decline. The fact that we were unable to see more than a few gharial after extensive stays at river stretches described as "teeming with crocodilians" forty years ago indicates the rapid change that has taken place.

Gharial are shot at, netted and prevented from basking in all but the most remote places and today there are a very few spots free from commercial fishing and other river activities. The gharial is a river animal and there is very little evidence that it lives and breeds in the still waters of lakes and ponds.

Status

In 1921 Shortt (J. Bombay Nat. Hist. Soc.) wrote a note about hunting mugger and gharial in North India and described the Kosi River as "teeming with reptiles" and a parallel river, the Sathar Dhar as "full of crocodiles of both classes". Other early gharial observers, such as Hornaday and Champion clearly indicate that the northern river systems had large Gavialis populations. In 1880 Hornaday (Two Years in the Jungle, New York) wrote that he could count 64 gharial in two hours on the banks of the Yamuna.

Now, almost a century later, the gharial is on the brink of extinction. Prior to the Madras Snake Park investigation, J.C. Daniel (Curator of the Bombay Natural History Society), S. Biswas (Zoological Survey of India) and S.P. Shahi (Chief Conservator of Forests, Bihar) have done survey work on the gharial and all evidence points of the extreme rarity of the animal and the dubious chances of its survival.

Conservation

1. Further and more detailed investigation of the status of Gavialis gangeticus and its present distribution.

2. Location of populations in protected areas such as sanctuaries and Reserve Forests under Forest Department control and within reservoirs and lakes under Fisheries Department. Designation of these areas as gharial preserves.

3. Capture and removal of individual gharial which still exist in populated areas and are therefore likely to be killed, to protected areas.

4. The establishment of a captive or semi-captive breeding stock of Gavialis, preferably near original riverine habitat, collection of eggs, rearing of young.

5. Publicity for gharial in English and vernacular papers and magazines. Official notification to authorities and public by State and Central Forest and Fisheries Departments.

6. Investigation and reports to State Wildlife Officers by Divisional Forest Officers and Forest Range Officers in the field.

Export of crocodilian skins has been banned by the Central government since 1958 and various states had banned crocodilian killing years prior to the order. However, the depletion of these animals has continued unabated to the present drastic situation. The Wildlife Protection Act of 1972 gives Gavialis complete protection but will be ineffectual unless a special effort is made to publicize the law and afford real field protection in the few areas where it can continue to survive.

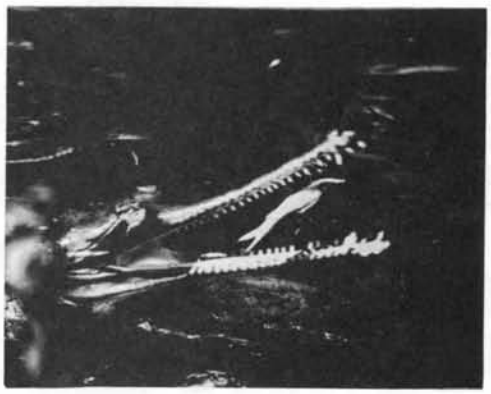
A river with gharial, an important predator/scavenger of great antiquity, is a sign of a healthy, ecologically balanced environment.

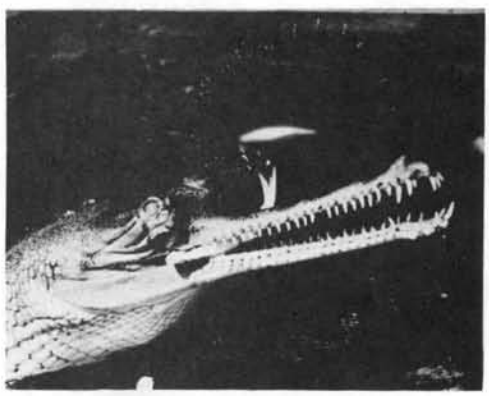
The Madras Snake Park wishes to cooperate in a comprehensive all India program for the conservation of gharial and extends this offer to the concerned authorities of the various (Indian) states.

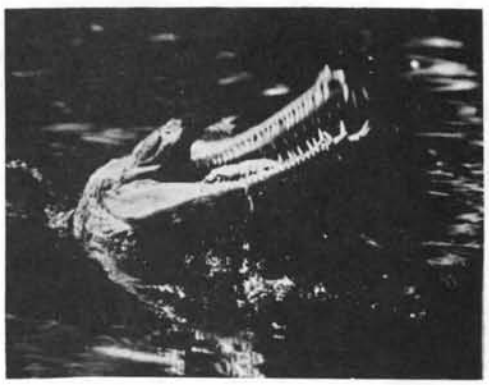
From: Gharial Survey Report

Provided by: Romulus Whitaker
Madras Snake Park Trust
and Conservation Centre
Guindy Deer Park
Madras, India 600022









This photographic sequence of captive adult Gavialis gangeticus illustrates the feeding behavior of this specially adapted fish eater. Courtesy Mysore Zoo, Photos by R. Whitaker.

NEW PUBLICATIONS

ILLUSTRATED GUIDE TO AMPHIBIANS AND REPTILES IN KANSAS--AN IDENTIFICATION GUIDE by Daryl Karns, Ray Ashton, and Tom Swearingen. Published by: The Museum of Natural History and the State Biological Survey, University of Kansas, Lawrence.

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REPTILES AND AMPHIBIANS IN MASSACHUSETTS by James D. Lazell, Jr. Second Edition, updated; new format, bound; only state herpetology for New England; Keys, photos, ranges, and care of captives. Available for $2.00 (plus $.25 postage and handling) from:

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WEST INDIAN PUBLICATION

EARL G. LONG (formerly of the Rockefeller Foundation Schistosomiasis Lab in Castries, St. Lucia; now finishing his degree in parasitology at the London School of Hygiene and Tropical Medicine) has recently put out an interesting booklet entitled, "The Serpent's Tale. Reptiles and Amphibians of St. Lucia" (Iouanaloa Ser., No. 2, ix 46 pp., September 1974). Although primarily aimed at educating St. Lucians about the reptiles and amphibians around them, this paper is the only currently available summary of the herpetofauna of St. Lucia.

The paper contains sections on pronunciation of scientific names, the nomenclature and origin of the fauna, and most valuably, firsthand observations on the ecology, behavior, distribution, conservation and folklore of St. Lucian amphibians and reptiles.

Earl is a native St. Lucian whose interest in the fauna of his island is exceeded only by the assistance and generosity he extends to visiting biologists. Despite the difficulty of obtaining pertinent references to the eastern Caribbean, Earl has produced a most creditable paper.

Available from:

U.W.I. Extra Mural Department
P.O. Box 306, Castries
St. Lucia, West Indies

$2.00 U.S. and Jamaican,
90p U.K. and
$4.00 Eastern Caribbean

A new list of Carnegie Museum publications on reptiles and amphibians, 1901-1974, is available from the Section of Amphibians and Reptiles, Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, PA 15213.

NEOTROPICAL NEWS

A new serpentarium has been instituted at the Universidad de Antioquia's Medical School (Medellin, Colombia). Dr. RODRIGO ANGEL is studying the histochemistry of the venom gland in some Bothrops, especially the terciopelo (B. atrox). His future plans include research on the toxicity of Colombian snakes and the preparation of antivenins. Dr. Angel is also working closely on another terciopelo project with the ROGER BOLANOS group in the Instituto Clodomiro Picado of Costa Rica(see Herp. Review 5(2):36-37, 1974).

The Centro de Zoologia Aplicada(Cordoba, Argentina, Apartado 122) is actively working to produce a catalogue of the snakes of the Cordoba Province. Director Dr. JORGE ABALOS and herpetologists ISMAEL di TADA and RICARDO MARTORI are also studying the herpetofauna of the Pampa de Achala (Cordoba Prov.), which is known to have many interesting Andean-Patagonian relicts. A very important section of the Centro is a serpentarium, where antivenin is produced. More about this in a future issue.

MIGUEL ALVAREZ DEL TORO (Instituto de Historia Natural, Tuxtla Gutierrez, Chiapas, Mexico) is continuing his research on the Chiapan herpetofauna, which still yields surprises. In addition, he is starting a natural-history study of the turtle Dermatemys mawii, which may lead to intensive breeding for commercial purposes. A second edition of his "Reptiles de Chiapas" (see Bogert's review of first edition in Copeia 1961:506) appeared in 1972; it is essentially a new book, with abundant new information and many new photographs. Copies are available from the Instituto de Historia Natural (Cost: US $10; send money orders only).

SIXTH LATIN AMERICAN ZOOLOGICAL CONGRESS

The VI Congreso Latinoamericano de Zoologia was held in Mexico City, September 30 through October 5, 1974. Among herpetologists attending the Congress were Marcos A. Freiberg, Jose Maria A. F. Gallardo, and Osvaldo A. Reig (Argentina), P. E. Vanzolini (Brazil), Fabio Heredia Cano (Colombia), Sixto J. Inchaustegui (Dominican Republic), Ticul Alvarez, Gustavo Casas, R. Marquez, and R. Martin del Campo (Mexico), W. Frank Blair, Orlando Cuellar, and C. J. McCoy (USA), and Federico Achaval, Miguel A. Klappenbach, and Raul Vaz-Ferreira (Uruguay).

Symposia on the program included "Population Ecology and Genetics," "Evolution of Vertebrate Faunas During the Cenozoic," and "Evolution and Modern Taxonomy of Amphibians." In the population genetics symposium Reig discussed the ecological significance of variation in karyotype, using several examples from amphibians and reptiles. Dr. Rosendo Pascual (Argentina) included data on reptiles and amphibians in a synthesis of the origin and evolution of South American Cenozoic vertebrates.

The symposium on amphibian evolution and taxonomy was opened by Reig, who reviewed fossil evidence of anurans and presented a revised classification of the group. Gallardo discussed the taxonomic importance of behavior in the Amphibia. Blair reported preliminary results of studies comparing the ecology of desert anuran faunas in northwestern Argentina and southwestern United States. Cano described field experiments in hybridization of *Bufo blombergi* and *Bufo marinus* in Colombia.

Other herpetological papers on the program were: *Helicops carinicaudus infrataeniatus* in Uruguay, F. Achaval and Claudio Stern; Reproductive behavior in captivity of Hispaniolan turtles of the genus *Chrysemys*, S. Inchaustegui;

Morphometric characteristics of adults, hatchlings, and hybrids, and geographic distribution of *Chrysemys decussata vicina* in Hispaniola, S. Inchaustegui; Nesting habits of *Lepidochelys olivacea* and *L. kempi* on the coasts of Jalisco, Oaxaca, and Tamaulipas, Mexico, G. Casas-Andreu; Protection of the Young in Leptodactylidae, R. Vaz-Ferreira.

A meeting of the Latin American Association of Ichthyologists and Herpetologists (ALAIH) held during the Congress produced a large and enthusiastic response. The organizers of the Congress were Dr. Hector Mayagoitia Dominguez (President), and r. Gonzalo Halffter (General Coordinator).

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IN THE NEWS

Univ. of British Columbia graduate student Carl Whitnew has found that male frogs go "gribbit" when defending a territory, but go "'grabbit' when feeling lusty about the opposite sex." (San Francisco Chronicle).

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Scientists at the Steinhart Aquarium in San Francisco are studying the behavior of a two headed Pacific Gopher snake. Since both heads eat and drink at the same time, they want to learn which head makes up its mind. The snake has been in captivity for over 5 years. (Milwaukee Journal).

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The Mexican government is planning to fill irrigation canals and lakes with bullfrogs in an attempt to supply the "peasant" population with a source of protein and to fight malnutrition. (San Francisco Chronicle).

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Chang Chi-tsai, a peasant weather observer in the central Province of Honan, China has found that "If frogs croak on a fine day it will rain in two days. If frogs croak after rain it will be fine weather. It will continue to rain if frogs do not croak after successive overcast days." Mr. Chang achieved 81% accuracy in long-range forecasts and 79% in short-term predictions during 1973. (N.Y. Times).

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Reporter Bob Lancaster, of the Philadelphia Inquirer (28 June '74), investigated the furor caused by a Smithsonian Institution Foreign Currency Program grant to Dr. T. Uzzell of the Academy of Natural Sciences of Philadelphia for the study of hybrid edible frogs in Poland. A Republican Congressman from Idaho labeled the project as one "of the downright foolish things your tax money is spent for." The story of Lancaster's investigation concluded with "....its enough to make me wary the next time a politician gets conspicuously outraged about a modest grant for something like the study of the sex lives of Polish frogs.

"Especially when billions of dollars are meantime being dropped for projects like the development of already obsolete airplanes - to say nothing of the millions required to build helicopters for the President to hand out as personal gifts to his buddies abroad."

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Steve Christman received the Austin Medal for distinguished performance in Zoology. The award is named in honor of Dr. Oliver L. Austin, Jr. and Steve is the first recipient.

CONSERVATION NEWS

A bill was passed by the Senate which designated 49,097 acres in southern Virginia as the Great Dismal Swamp National Wildlife Refuge (Milwaukee Journal).

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The National Audubon Society has submitted an application to the Interior Department to capture 500 alligators in Louisiana and transplant 300 in Arkansas and 200 in Mississippi. (Milwaukee Journal).

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According to TIME (5 Aug '74) the undesirable Bufo marinus has invaded Australia's Northern and Western Territories. Farmers and wildlife experts feared that the large toads would prey upon beneficial insects and native frogs. A substantial bounty was placed on the toads to induce people to assist in their removal.

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The Gucci Corp., famous for leather goods, was fined $2,500 for trying to sell crocodile shoes in Beverly Hills, California. Gucci representatives pleaded guilty to the charges of importing illegal goods into the state. (Milwaukee Journal).

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In an attempt to protect the Californian rough-skinned newt (Taricha granulosa) the East Bay Regional Park District put up signs on the edge of Briones Park in Contra Costa county proclaiming CAUTION NEWTS XING with a large image of a newt also on each sign. Chris Nelson, the park district's chief naturalist, has seen as many as 200 newts dead on the road at one time. (San Francisco Chronicle, 13 Dec. '74).

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All of the metal signs erected to protect a colony of newts on the edge of Briones Park were stolen. The metal signs have been replaced with plywood signs which also bear the image of a large newt. (San Francisco Chronicle, 15 Jan '75).

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Plethodon jordoni clemsonae has been rediscovered in South Carolina's Bad Creek area which is the only place it is known to occur. Thought to be extinct in the early 1970's, the Clemson salamander was originally described in 1927. (Bio Science, January 1975).

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On 21 June 1974 the Pennsylvania Fish Commission announced that legislation was desirable in the Pennsylvania General Assembly to give the Commission jurisdiction over all amphibians and reptiles, besides fish. The proposed legislation would give the Fish Commission power to promulgate rules necessary to conserve, protect or "assure the future" for amphibians and reptiles which might become rare and endangered. Without this legislation, there can be no assessment by the Fish Commission or any state agency to determine the status of various species of herps. (Pennsylvania Fish Commission News).

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PENNSYLVANIA CONSERVATION NEWS

During the 1974 session the General Assembly of Pennsylvania enacted legislation to provide legal protection for all native amphibians and reptiles. An amendment to the "Fish Law of 1959" authorizes the Pennsylvania Fish Commission to"regulate, control, manage, and perpetuate" amphibians and reptiles. In the past, the Commission has

regulated only the taking of tadpoles, bullfrogs, and aquatic turtles. The new legislation extends Commission jurisdiction to all amphibians and reptiles "living free in nature" in the state.

Other important parts of the act empower the Commission to make rules and regulations for both taking and possession of amphibians and reptiles, to set seasons and possession limits, and to issue collector's permits for educational and scientific purposes. The responsibility for protection of rare and endangered species of amphibians and reptiles is also given to the Fish Commission, and fines are set for violation of any regulations that may be established.

In another action the Pennsylvania Fish Commission has declared an indefinite closed season on four species of aquatic turtles that are rare or endangered in the state. The protected species are Blanding's turtle (Emydoidea blandingi), Smooth softshell (Trionyx muticus), Red-bellied turtle (Chrysemys rubriventris), and Eastern mud turtle (Kinosternon subrubrum). All four species are "peripheral" and enter the state in limited areas. Blanding's turtle and the Smooth softshell are rare in Pennsylvania - neither has been taken in the state since around 1900. Pennsylvania populations of the Red-bellied turtle and Eastern mud turtle are threatened by industrial development and urbanization of the Delaware River Valley. These four species join the Bog turtle, protected by special act in 1974 (Herp.Rev. 5:44), on the "collecting prohibited" list.

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SSAR MEMBERSHIP PROPOSED AMENDMENT

The Board has approved submission of the following amendment for consideration by the membership at the forthcoming annual meeting of the SSAR in Fullerton, California (Aug. 11-14, 1975):

Article III. The Board of Directors

(present) Section 1. The Board of Directors shall consist of the Chairman, Chairman-Elect, Secretary, Treasurer, four Directors and the immediate Past-Chairman.

(proposed) Section 1. The Board of Directors shall consist of the Chairman, Chairman-Elect, Secretary, Treasurer, six Directors and the immediate Past-Chairman.

If you have any questions please contact Stephen R. Edwards, Secretary, SSAR:

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The dorsum of the rear foot of a hellbender Cryptobranchus alleganiensis (by Roberta Plummer - MPM).

ANOMALIES IN ADULT BUFO ARUNCO AND LARVAL CALYPTOCEPHALELLA CAUDIVERBERA

Alfredo Salibian and Jorge Cabrera

Descriptions of anomalies of Chilean anurans are not frequent, but there are reports of atrophic oviducts and partial albinism in adult Pleurodema bibroni, coxigeous sacralization in Calyptocephalus gayi and syndactyly and brachydactyly in P. bibroni (Capurro, 1953, 1955; Cei, 1958; Marelli, 1927).

The present communication describes two anomalies not previously reported in our amphibian fauna. Both findings correspond to specimens taken in June, 1973, in the Piscicultura de Curico, Servicio Agricola Ganadero, Republica de Chile.

We captured a "one-eyed" juvenile male specimen of the Chilean toad Bufo arunco with a series of normal toads. We kept the captive toad alive for several weeks in our laboratory, at room temperature. It was force fed frozen slices of beef liver.

The "absent" eye was actually located inside the buccal cavity (Figures 1 and 2) and was morphologically complete. Dr. H. Maturana made preliminary measurements on that eye and was able to show that it was physiologically normal and active. No cicatrice was observed and the area in the skull corresponding to the ocular globe was covered with skin with characteristics undistinguishable from other regions of the dorsal skin.

The other anomaly was a semi-albinistic larval Calyptocephalella caudiverbera (= C. gayi). This is a very rare anomaly. The captured tadpole was in stage 42 (Gosner, 1960) (Figure 3). The slight pigmentation was limited to the anterior end and the remaining part of the skin was pale yellowish. It was captured in a large fishpond containing approximately 5,000 "normal" larvae. This suggests the very low incidence of this anomaly in that population.

Capurro (op. cit.) and Cei (op.cit.) have interpreted the anomalies found in P. bibroni as "probable mutational" in origin. The same interpretation could apply to the semi-albino reported herein. However, an early accident, other than genetical, may have caused the anomaly in the "one-eyed" B. arunco.



Figure 1.-- "One-eyed" Bufo arunco collected in Curico, Chile.

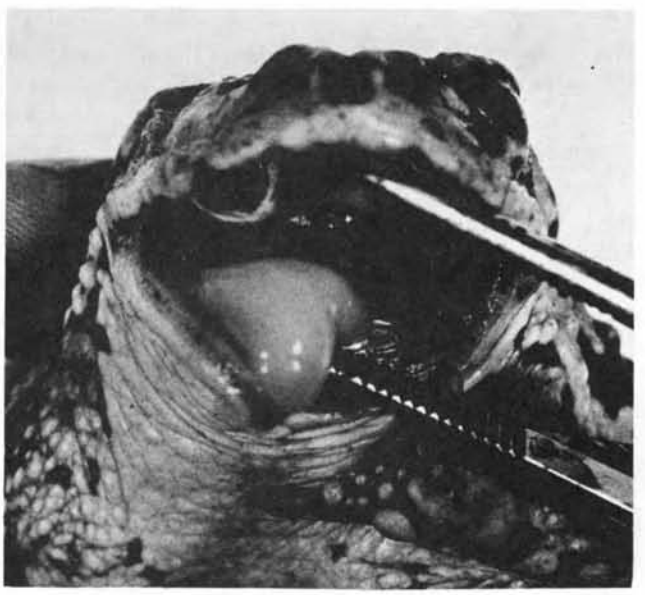


Figure 2.-- The same specimen of Figure 1; the "absent" eye is actually inside the buccal cavity.

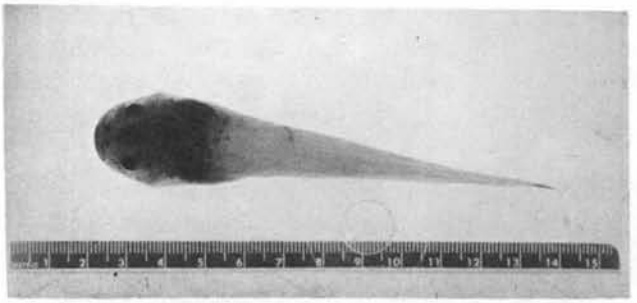


Figure 3.-- Dorsal view of a semi - albinistic Calyptocephalella caudiverbera tadpole from Curico, Chile.

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Gosner, K. L. 1960. A simplified table for staging anuran embryos and larvae with notes on identification. Herpetologica 16:183-190.

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Division de Pesca y Caza
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The Second Recorded Occurrence of an Albino Thamnophis radix radix (Baird and Girard)

Hensley (1959) records the only albino Thamnophis radix radix as being collected in the Chicago area, Cook County, Illinois. This specimen was described by May (1952) as being a partial albino or amelanistic. It lacked melanophores although it had yellow reflecting guanophores.

The second specimen was collected by Laura Strezo on 21 September 1973 in the western suburbs of Chicago. The specimen was a newborn female with a snout-vent length of 196mm and a tail length of 39mm. It had pink eyes , tongue, and ground color. In life the dorsal stripe was a pale yellowish-orange and the lateral stripes were pale yellow. The belly was dull white. Paired yellow occipital spots were prominent on the head.

Lepidosis agreed closely with T. radix as described by Smith (1961). The specimen is now in my private collection (SD-058). Acknowledgement: I thank Harry W. Greene for critically reviewing the manuscript.

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MORE HERPETOLOGICAL TYPE-SPECIMEN LISTS

Dowling, Gilboa, and Zweifel (1970, Herp. Rev. 2(3):53-54) provided a useful bibliography of herpetological type-specimen lists that included citations for most lists published through 1969. Since then lists of types in several important collections have been published. These addenda to the "list of herpetological type lists" are cited here, together with references to some lists not mentioned in the previous compilation.

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MARKING ANURANS WITH SILVER NITRATE

Branding of individual amphibians is desirable for determining population estimates and migratory habits. Marks should be inexpensive, reliable, easily applied with a minimum of equipment, and should not affect normal behavior.

Brands made by silver nitrate were identifiable on marine polychaete annelids for over 30 days (Klawe, 1954), on eel (Anguilla anguilla) for over 5 months (Harder et al., 1962) and on carp (Cyprinus carpio) for over 18 months (Zarnecki, 1963). Channel catfish (Ictalurus punctatus) have been branded with silver nitrate at this laboratory with mark retentions of over 20 weeks.

A population of green treefrogs (Hyla cinerea) living in an enclosed wet laboratory was used to study the effectiveness of silver nitrate for marking under semi-natural conditions.

Brands were made with the commercial silver nitrate applicators ordinarily used in veterinary cauterization. Each applicator was a wooden stick, 15 cm long by 2 mm thick, and had a tip, about 8 mm long, impregnated with a preparation of 75% silver nitrate and 25% potassium nitrate.

Seven adult treefrogs were branded with different marks. Marking was done with one to three tracings of the applicator on the treefrog's back; the moisture of the skin activated the chemicals. A dark brown mark was formed immediately upon contact (Fig. 1). One animal smeared the mark by struggling, developed a dark color over most of the back, and was found dead 5 days later, possibly of silver nitrate poisoning. Except for brief reactions to the cauterizing chemical, branding had no apparent detrimental effect on the other treefrogs. On three treefrogs, the dark mark had faded into a light mark by 13 days after application. The remaining three were not seen during this period, but later observation revealed that the dark marks had also faded into light marks. This light mark was more difficult to identify than the dark one, but was visible for over 9 weeks.

The ground color of green treefrogs contrasts well with both the initial dark mark and the later light mark. Where long-term marking is needed, this technique should be most useful for dark colored amphibians. The applicator should be moistened before use on dry-skinned amphibians such as toads.

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Figure 1.--Black line along back of green treefrog 1 week after marking with silver nitrate applicator.

FREEZE-DRYING ANURAN TADPOLES FOR TAXONOMIC EXAMINATIONS

Many taxonomic characters used in the identification of tadpoles concern structures on the oral disc. When preserved in formalin, even species with a small oral disc die with the mouth closed tightly and the oral disc collapsed so that accurate measurements and drawings are difficult. Also, papillae on small specimens are often so translucent that examination is difficult.

Freeze-drying (lyophilizing) (Hower, 1967) corrects the above problems, and it is the only method I have found that gives the desired results. If live tadpoles are placed in the freezer-drier with enough water to cover them and are killed by simultaneous freezing and degassing, they die straight with the mouth open and with the oral disc extended but not distended. After drying, the oral disc and associated structure are opaque white in sharp contrast to the labial teeth. With a sharp blade, the oral disc and jaws can be removed and mounted dry under a coverslip supported by a ring for convenient and accurate observations later.

In fact, the whole body and fin confirmations are maintained satisfactorily and other delicate and translucent structures like the spiracle, vent, and buccal papillae are preserved in natural non-collapsed and easily-preserved positions. The dried specimens are not overly delicate and are easily dissected. If specimens preserved in formalin are rinsed in running water overnight, they will also freeze dry reasonably well, although the various structures stay in their fixed positions.

LITERATURE CITED

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A METHOD OF OBSERVING MOVEMENTS OF AQUATIC TURTLES

Information accumulated on movements of aquatic turtles has been largely collected by "capture-release" methods (Pearse, 1923; Cagle and Chaney, 1950; Ream and Ream, 1966). Two reported methods of direct observation include goggling (Marchand, 1945) and painting the carapace and observing movements with binoculars from an observation tower.

The aquatic movements of turtles were observed by us by placing a 1/8 inch diameter wooden dowel in the nucal scute (Fig. 1). The hole in the scute was made with a small drill and the dowel was secured with epoxy glue. The length of the dowel depended upon the size of the turtle with a maximum length of 50 cm being used on the largest turtles. Recognition of individuals was accomplished by color coding the distal end of the dowel with paint or plastic tape. When the turtles were in shallow water or were swimming near the surface, their exact location could be plotted by direct observation.

A disadvantage of this method is that the turtle's movement is hindered in heavy vegetation. This was alleviated to some extent by connecting two short dowels with a piece of rubber tubing. This provided greater flexibility while the turtle moved through vegetation and the dowel tended to assume a more horizontal position when the turtle surfaced, thus preventing top heaviness and minimizing wind resistance.

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Warren Davis, Jr., and George Sartor
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University of Texas, San Antonio



Figure 1.--A Chelydra serpentina with dowel affixed.

BOOK REVIEW

REASSESSMENT OF MUSCLE HOMOLOGIES AND NOMENCLATURE. By Aselaide Frost Ellsworth. Robert E. Krieger Pub. Co., P.O. Box 542, Huntington, N.Y. 11743. 1974, vi-74, $24.50 (Available from publisher).

Comparative anatomists may note the publication of a new book that deals exclusively with their subject. In a total of 80 pages the author describes and compares the pelvic musculature of the echidna, opossum and tuatara.

Chapter 1 gives a brief introduction and discussion of the evolutionary relationships of stem reptiles and mammals.

After the materials and methods (Chapter 2) and observations (Chapter 3) the next 35 pages describe in detail the musculature, nerves, and skeletal patterns of the subject animals. To illustrate descriptions the author uses detailed line drawings and black and white photographs.

In addition, fifty-two color plates graphically illustrate the dissected skeletal elements and musculature. They are complete with inserted arrows and identification numbers for added clarity. A five page bibliography concludes the text.

Ellsworth's book should be an essential reference if you are interested in the comparative anatomy of primitive mammals and reptiles. If you are not an advanced student of anatomy you will probably realize little for the investment.

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A LABORATORY THERMAL GRADIENT

This paper describes the construction of a thermal gradient for studying temperature preferences of small, secretive snakes and lizards. The chamber is a terrarium (92 cm long,27 cm wide, 27 cm deep)insulated on the floor, two sides, and one end with 0.63 cm styrofoam. The substrate is sand 70 mm deep. Heat is provided by a 150 watt thermostat-equipped aquarium heater. One end of a sheet of aluminum foil is wrapped around the heating element. The tip of the heater is buried in the sand to the top of the heating element at the insulated end of the terrarium. The remainder of the foil is doubled into a sheet 145 x 75 mm. The sheet is buried 5 mm below the surface of the sand and extends from the heater to approximately the center of the terrarium. Five masonite cover items (145 x 75 mm) on small wooden blocks were spaced 70 mm apart the length of the terrarium (Fig. 1).

At the opposite end of the terrarium an "S" shaped brass tubing (12 mm diameter) is buried 5 mm below the surface of the sand and used as a cooling element. A seven liter aquarium is placed adjacent to the uninsulated end of the terrarium. An aquarium pump and filter (Dynaflo Motor Filter by Metaframe) is mounted on the side of the aquarium and is used to circulate cold water from the aquarium, through the brass tubing, and back to the aquarium.

The chamber produces a temperature gradient starting approximately 35 mm from the heating element and extending to the cool end of the terrarium. Temperatures around the element are above 100 C. Cover items evenly spaced throughout the length of the terrarium create hiding places along a range of substrate temperatures. One disadvantage is that an aquarium heater used dry only lasts about one month.

Other thermal gradients have proven satisfactory but lacked certain important conditions for studying habits of secretive species. Clark's (1968) method produced a sufficient temperature range but lacked "natural" substrate or cover items. Vance's (1973) gradient had "natural" substrate but lacked cover items. Furthermore, Vance's technique lacked a cooling mechanism and produced a minimum temperature equal only to room temperature (20-24 C).

The thermal gradient described in this paper produced temperatures from 10-45 C, well below and above the preferred body temperatures of most reptiles. By providing semi-natural substrate and cover in such a thermal gradient, one should be able to better estimate preferred body temperatures of small, secretive species.

The following people were helpful in exchange of ideas: Dr. James R. Dixon, Harry W. Greene, Fred S. Hendricks, and Robert A. Thomas.

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Vance, V. J. 1973. Temperature preference and tolerance in the gecko, Coleonyx variegatus. Copeia 1973:615-617.

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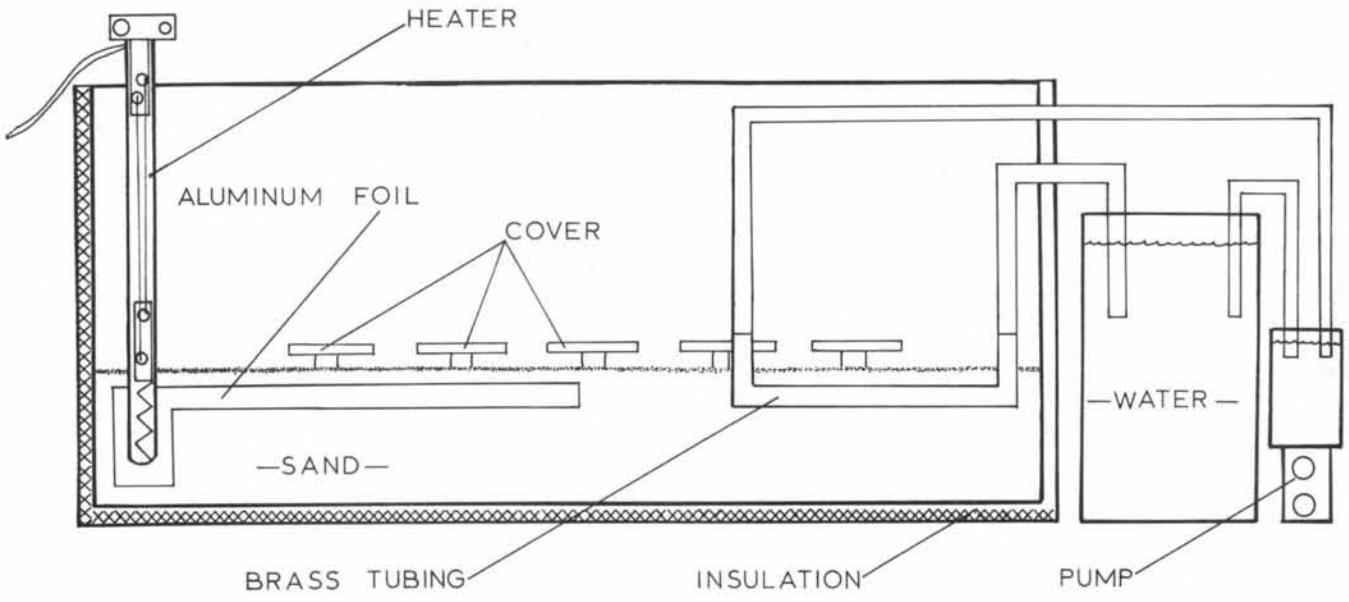


Figure 1.--Diagram of thermal gradient setup.



The Texas Herpetological Society is one of the oldest state societies and has been quite active in conservation. The above photo was taken at the THS November, 1974 meeting in San Marcos, Texas.

HERPETOLOGY AT TEXAS A&M UNIVERSITY

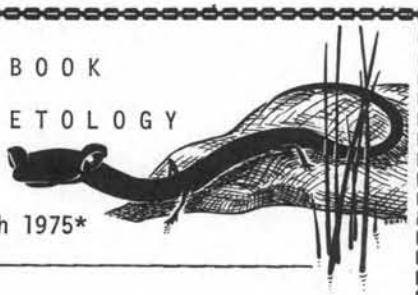
The Texas Cooperative Wildlife Collection (TCWC), housed in the Department of Wildlife and Fisheries Sciences, presently has in excess of 48000 catalogued reptiles and amphibians with emphasis on South American, Mexican, and Texan forms. The cleared-and-stained and skeletal portions of the collection are expanding and currently contain 368 and 205 entries, respectively. The TCWC houses 25 holotypes and approximately 300 paratypes.

Dr. James R. Dixon, chief curator of the TCWC, is continuing his studies of the herpetofauna of the Iquitos, Peru, region. His prime research interest at present centers around teiid systematics, but he is involved in numerous other studies including the ecology of selected Venezuelan anurans and lizards and systematic studies of several Amazon Basin snakes.

Terry L. Calvin has recently completed an MS degree with an ecological study of the herpetofauna of the Navasota River basin. Steve Cornelius is continuing his investigation on nesting and survival of hatchling sea turtles in Costa Rica. Ben E. Dial is finishing his investigation of the ecosystematics of Coleonyx brevis and C. reticulatus. Fred S. Hendricks has received his PhD degree with an analysis of the systematics of Cnemidophorus tigris east of the continental divide. For the past semester he has served as a lecturer in ichthyology for the department and will remain on the staff in the spring while continuing his studies of the paedogenic Eurycea. Charles M. Mather is initiating a study of niche partitioning between Sceloporus undulatus and S. variabilis in south Texas. Carlos Rivero-Blanco of the Universidad Simon Bolivar in Caracas, Venezuela, will pursue ecological studies of Gonatodes. Mark A. Staton has recently returned from Venezuela where he is working on the ecology of caimans. He will do similar studies on the American alligator in Texas and is presently working up several studies conducted on Venezuelan herps. Robert A. Thomas is revising the genus Philodryas and is involved with problems related to other colubrids of the Bolivian and Peruvian highlands. He completed his MS degree with a study of geographic variation in Elaphe guttata. John A. Wiest, Jr. is revising Chrionius and recently compelted an MS degree with a study of anuran succession to ponds in the Brazos County, Texas, region.

Several student in the Department of Biology are engaged in research which involves herpetozoa. James A. Bennett is working on the effect of polarized light on movement of hatchling sea turtles to the sea. Edmund V. Guidry is studying the parasites of various species of Natrix and W. Lynn Jagers is doing the same with Siren intermedia.

The
YEARBOOK
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HERPETOLOGY
for
1974
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15 March 1975*



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A METHOD FOR FORCE-FEEDING SNAKES

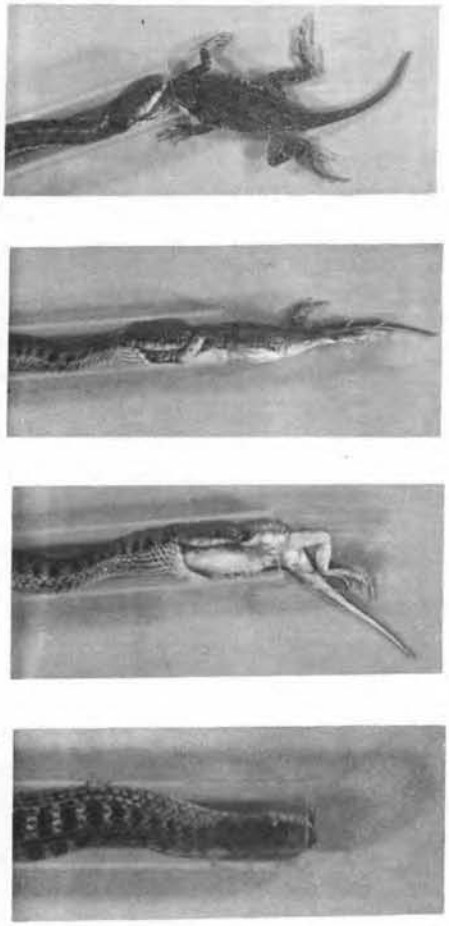
Captive snakes often refuse to feed voluntarily. The following is a method for force-feeding snakes with a minimum chance of injury to the snake or to the handler.

Force the snake being fed, into a plastic or glass tube (making sure that the ends of the tube are smooth) which is 33%-50% the length of the snake. The internal diameter of the tube should be about 1.5 times the diameter of the snake, or slightly wider than the width of the snake's head if it is greater than the body diameter. Once the snake's head has reached the opposite end of the tube, grasp the snake firmly to prevent it from crawling through the tube. It must not be allowed to push its head completely out of the tube.

The food item should have a diameter 0.5-0.65 times that of the snake and should be gently shoved into the snake's mouth and to the back of the throat. If the tube diameter has been well-chosen and the snake has not been allowed to push its head through the tube opening, then it should be able to swallow the food item while in the tube, but be unable to disgorge it. The snake should remain in the tube until swallowing is completed.

The advantages of this method are that (1) a tight grip on the snake's neck is not necessary once it is in the tube; (2) the tube holds the body straight to facilitate swallowing; (3) nothing is forced down the snake's digestive tract for any distance; and (4) risk to the handler is minimized if a venomous species is being fed.

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The sequence illustrates a garter snake (Thamnophis) being fed a lizard (Holbrookia).

BOOK REVIEW

HUSBANDRY, MEDICINE AND SURGERY IN CAPTIVE REPTILES. By Fredric L. Frye. 140p. VM Publishing, Inc. Bonner Springs, Kansas 60012. 1973. $18.00

Those who maintain live reptiles are sometimes confronted with problems of reptile diseases. Diagnosis and current treatments of reptilian diseases have not been adequately discussed in many of the general accounts of the care of captive reptiles. Generally, such information has been lacking or is beyond the scope of books destined for the use of the general public. A notable exception is SNAKES: THE KEEPER

AND THE KEPT by the late Carl Kauffeld. Nevertheless, I know of no volume comparable to the attractive book by Dr. Frye. It is the first modern significant work devoted to husbandry, medicine, surgery and pathology of all major groups of reptiles excluding the Rhyncocephalia.

Few veterinarians are competent in the treatment of reptile diseases but with the appearance of this book perhaps there is a possibility of greater interest and professional interaction between those who maintain live reptiles and those who may be called upon to treat reptilian diseases. The result should be beneficial to captive reptiles.

The title of this book is clearly indicative of its content: reptile husbandry (34 pages), medicine (63 pages), surgery (24 pages). There is also a brief epilogue, glossary and index. Excellent illustrations of gross pathology, surgical management, and numerous photomicrographs occur throughout the text in an accessible atlas format. The section and illustration on hematology is sure to be consulted by clinical vetinarians and students of reptile medicine.

The section on husbandry contains information on housing, water and humidity, temperature, photoperiod, reproduction, problems associated with nutrition-inanition, avitaminosis, steatitis, fibrous osteodystrophy (frequent in captive iguanas), blepharitis, conjunctivitis and others. The text is concise and the section concludes with a list of 50 references.

The section on medicine contains information on hematology, respiratory infections, infectious stomatitis, abscess, septicemic cutaneous ulcerative disease, trauma, thermal burns, shell defects, shell-plate sloughing, shell fungus, salmonellosis, dysecdysis, fluid replacement therapy, ophthalmic diseases, pseudoneoplasms, parasitism, developmental anomalies, radiology and cardiology. Appropriate treatment is discussed after each disease is presented. Tables list parental antibiotics, miscellaneous drugs, topical ointments, sprays and solutions and parasiticides used in captive reptiles. This information will be of singular interest to herpetologists who may not have convenient information on appropriate drug therapy for captive reptiles. The section concludes with a list of 73 references. In my judgement, this section of the book is a cogent contribution to reptile medicine.

The section on surgery and pathology contains information on anesthesia, presurgical preparation of reptilian patients and much information on surgical procedures. Neoplasia is also discussed. Interestingly neoplasia in reptiles is seldom well documented in the literature but malignant and benign tumors do occur. Lymphocytic leukemia in *Boa contrictor*, osteosarcoma in a monitor lizard and fibrosarcoma in a boa are diagnosed. Pathology was supported in part by a grant from the National Cancer Institute.

This book is specifically written for the practicing veterinarian clinician but it can and should be consulted by anyone concerned with the well-being of captive reptiles. Dr. Frye prefers to see animals in their native habitats and not confined in cages. However, since certain animals are likely to be confined, Dr. Frye states that he must not fail to render what service he can to help preserve such captive creatures in a state of health and (modified) well-being. He wrote this book for that reason. Hopefully a similar volume on amphibians will be forthcoming.

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I M P O R T A N T

The correct dates for the 1975 SSAR-HL Fullerton meetings are Aug. 11-Aug. 14 with the SSAR Board meeting Aug. 10.

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LIFE HISTORY

Thamnophis s. sirtalis. On 24 August 1971 a female garter snake (100.5 cm total length) was collected 3 miles east of Carbondale, Jackson County, Illinois. It was maintained in captivity until 5 September 1971 when it gave birth to 96 normal and 7 deformed and stillborn young (103 total).

The young were measured and ranged from 17-21 cm ($\bar{x}$ = 19.8) total length and 4-6 cm ($\bar{x}$ = 4.6) caudal length. Scutellation agreed closely with the data presented by Smith (1961. Amphibians and Reptiles of Illinois. Ill. Nat. Hist. Surv. Bull. 29(1):233). Infralabials: 9+9 (9%), 9+10 (19%), 10+10 (71%) and 10+11 (1%). Supralabials: 7+7 (99%) and 7+8 (1%). Postoculars: 2+2 (1%), 2+3 (3%), 3+3 (89%), 4+4 (1%) and 3+4 (6%). Preoculars: 1+1 (98%) and 2+2 (2%).

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Duberria varigata. On 29 December 1972 a female spotted slug-eater was captured under a decaying log in long grass at Sordwana Bay, Natal, South Africa. The snake had a total length of 373 mm (previous maximum recorded size 325 mm; FitzSimons, V.F.M. 1962. Snakes of Southern Africa, Purnell Ltd, Cape Town). Two days after capture eleven living young were born, two of which died shortly afterwards and were not preserved. The lengths and weights of the remaining nine young were recorded on 3 January 1973, and are shown in Table 1. An unusual aspect of the brood is the wide range of dorsal coloration and marking exhibited by the young, which is much more diverse than that found in adults (FitzSimons, 1962). Five of the young snakes accepted small slugs readily, and survived in captivity for over 150 days. It was noted that olfactory rather than visual clues appeared to be more important in the recognition of food, and snakes were frequently observed to follow the slime trails of slugs that were out of sight. After feeding adherent slime was wiped from the head against rocks, grass, etc. Growth was roughly linear, and 150 days after birth the young snakes measured 114-126 mm ($\bar{x}$ = 119 mm) in length, and weighed 2.02-2.40 gms ($\bar{x}$ = 2.13 gms). Sloughing occurred at approximately 44 day intervals (range 30-55 days). The mother (TM 42949) and seven of the young (TM 42955-7, 45588-91) are now in the Transvaal Museum, Pretoria, collection.

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TABLE 1

Number	Coloration		Length ($\bar{x}$ = 91 mm)	Weight ($\bar{x}$ = 0.58 gms)
	Ground color	Dorsal markings		
1	Black	None	95 mm	0.60 gms
2	Black	None	91 mm	0.60 gms
3	Black	Light flecks and light collar	90 mm	0.55 gms
4	Black	Few light flecks	93 mm	0.63 gms
5	Black	Few light flecks	91 mm	0.59 gms
6	Light Brown	Black collar, paired black vertebral spots	92 mm	0.56 gms
7	Light Brown	Black collar, paired black vertebral spots	90 mm	0.50 gms
8	Dark Brown	Paired small black vertebral spots	87 mm	0.61 gms
9	Dark Brown	None	89 mm	0.62 gms

GEOGRAPHICAL DISTRIBUTION

Sauria

ADDITIONAL RECORDS FOR ZYGASPIS NIGER AND Z. QUADRIFRONS. The following records supplement those of Saiff (1970, Herpetologica, 26(1):86-119).

Zygaspis niger: ANGOLA: Colanda 7 km from Vila Luzo, on Moxico road: CZL 44, 50, 202, 203, 314, 316, 363, 435, 528-531, 1147, 1959. SOUTH WEST AFRICA (CAPRIVI STRIP): 65 km WSW of Katima Mulili: UM 21255-21256. 15 km WSW of Katima Mulilo: UM 21362-21363, 22912-22927, 23059-23060. Katima Mulilo: UM 24219-24228.

Zygaspis quadrifrons: BOTSWANA: Serowe: CG 3469. Kabulabula: TM 14535-14536. Sunnyside: TM 14532. Molepolole (Kuke): TM 14532 . Mahlobahubilo: TM 26951. Kaotwe Pan: TM 14530. Gemsbok Pan: TM 14531. Aha Mts.: TM 26893. Kwebe Hills: UM 10685. 70 km S of Mamono: UM 11332, 13820. 30 km W of Rakops: UM 7518. Tsau: UM 10370. Toten: UM 10696. Kangyane Pan: UM 13039-13042. Kuki Pan: UM 16205. Tsodilo Hills: UM 16211-16212, 16238. 40 km W of Mohembo: UM 16281. Moremi Game Reserve: UM 20147-20151. Ghanzi: BM 1933.9.9.12-1933-9.9.13. Shorobe: UM 20766-20771, 20790-20805. Maun: UM 22738. 40 km S of Tsane: UM 22164-22308. 55 km S of Tshane: UM 22360-22392. Lekuru Pan: UM 22447-22470. 22 km N of Mabua Sehubi Pan: UM 22592-22635. 15 km S of Maxwee: UM 25420-25429. MALAWI: Nkula Falls: UM 20606, 20633. 5 km NE of Mpatamanga Gorge: UM 20631-20632. See also Steven (1974, Arnoldia Rhodesia, 6(30):1-22). MOZAMBIQUE: Inhamitanga: UM 21915. RHODESIA: --- CG 1587. Sawmills: TM 24694 (3 specimens); UM 648. Gilston Estates: CG 4004. Westwood: AMG 7174. Silverstreams, Melsetter: CG 4006; UM 18049-18050. 18367. Umtali: UM 29548. Ntaba Mangwe: UM 12647-12649. Binga: UM 14702. Karoi: UM 19922-19924, 23883-23884. Manyoni: UM 19710-19712. Dopi Pan: UM 20322. Chete Gorge: UM 25545. Kanyemba: UM 27927. Dandari Pan: UM 28327. Teaklands: UM 29659. Lake Macllwaine: UM 23238. Victoria Falls: 23193, 23196, 23198, 23201-23203, 23207, 29705-29710, 30240. SOUTH AFRICA: Kuruman: TM 15584. Vryberg: AMG 6733 (3 specimens). Soutpansberg district: CG 4929. Pietersberg: CG 4828; TM 2357. Ellisras: TM 27194- 27195. Tambeeti Kloff (Ellisras district): TM 27230-27231. Kruger National Park, Wambia to Mahlakuza: NKW 184. (See also localities in Pienaar, 1966. The reptiles of the Kruger National Park.) Warrendale: UM 16390-16391. SOUTH WEST AFRICA: 65 km WSW of Katima Mulilo: UM 21250-21254. 15 km WSW of Katima Mulilo: CG 4344-4345, 4347-4350; UM 21333-21361, 22893-22911. Katima Mulilo: TM 30505, UM 24229-24245. Namutoni: TM 3988-3989. Between Samangeigei and Gautscha Pan: TM 22594, 26318. Between Outjo and Okaukuejo: TM 17156-17157, 17159. Otjiwarongo: CG 3468. Waterberg: TM 20979. Teufelsbach, near Okahandja: AMG 7319. Windhoek: CG 3467, 4827; SMNS 3176 . Gammans, near Windhoek: TM 33572. Leibig's Ranch, 50 km SW of Windhoek: TM 17479-17480. Hakos Mts., 115 km SW of Windhoek: TM 24349. Samangeigei, Kungveld: TM 22593. Waterberg: HM 2893F. ZAMBIA:Kalabo: CG 3999-4002,4822; UM 21014-21016. Livingston: GC 3740. Ngoma: UM 16074. Manali: BM 1955.1.10.4. Chunga: UM 30039-30041, 30046.

Abbreviations refer to: AMG, Albany Museum, Grahamstown,South Africa; CG, Carl Gans collections; CZL, Centro de Zoologia, Lisboa, Portugal; HM , Zoologisches Museum, Hamburg, Germany; NKW, Kruger National Park, Skukuza, South Africa; SMNS, Staatliches Museum fur Naturkunde, Stuttgart, Germany; TM, Transvaal Museum, Pretoria, South Africa. UM, Umtali Museum, Umtali, Rhodesia. We acknowledge assistance from the collectors, the curators, and NSF GB-31088X. Submitted by DONALD G. BROADLEY and CARL GANS, Umtali Museum, Umtali, Rhodesia, and Department of Zoology, University of Michigan, Ann Arbor, MI 48104.



CLIFFORD HILLHOUSE POPE
1899-1974

It is difficult to decide whether Clifford Pope should be described as a writer or as a herpetologist. Actually he was both. He is perhaps more aptly characterized as a writer-herpetologist whose books did far more than any of their predecessors to arouse an intelligent interest in reptiles of the United States. His first publication, an article written for Natural History magazine, appeared in 1924, three years after he had begun his field work in China. Half a century later, after he had written eight books and nearly one hundred articles, Clifford died of a stroke on June 3, 1974.

Like a good many other naturalists of his generation, Pope was born in a small town, in his case Washington, Georgia. He was undoubtedly familiar with many of the vertebrates in the area before he entered the University of Georgia at the age of 17. Two years later, however, he left Georgia to continue his studies at the University of Virginia where he obtained his B.S. in 1921. That same year Roy Chapman Andrews, who had been instrumental in raising the funds that permitted The American Museum of Natural History to support another elaborate expedition to Asia, was looking for an assistant. Clifford applied for the position and was soon enroute to China. As leader of the Central Asiatic Expeditions, Andrews originally planned to have Pope act as a general assistant. But as Clifford observed later, "it soon became evident that there was nothing to hinder my working alone and independently as a collector of reptiles, amphibians, fishes and mammals. With a special fondness for reptiles, and an ever increasing interest in amphibians, I naturally spent most of my time and energy in the field of herpetology."

Other members of the expedition were also collecting amphibians and reptiles that were being sent back to the museum. Until Pope returned from China in 1926 these collections were being studied by Karl P. Schmidt, who had described new species in preliminary accounts, and summarized the results of the expedition in three faunal reports. Karl Schmidt's reports covered approximately half of the herpetological material eventually obtained from China, and Pope carefully noted that Schmidt's "thorough and conscientious beginnings" paved the way for the additional preliminary accounts that Clifford published after completing his field work. These preliminary studies, first by Schmidt and then by Pope, continued for more than a decade before Pope's comprehensive and well-planned volume, THE REPTILES OF CHINA appeared.

Whereas the first of Pope's articles to appear in print dealt with Hainan Island, an account of the breeding habits of two genera of plethodontid salamanders in North Carolina appeared shortly afterward. Pope had been interested in the salamander fauna of the southern Appalachians before he had gone to China. The year after he returned he wrote two popular articles that dealt with his experiences in China. That

same year the museum published the first, and also the last, ichthyological paper that Clifford ever wrote, a fairly extensive account of the fishes of Hainan. Even though this report on fishes was carefully prepared, it seems probable that Clifford regarded it as something of a chore, particularly when he was anxious to complete his studies of the amphibians and reptiles in the collections. Even while continuing his investigations and issuing reports in preparation for the volume that was to cover every reptile ever reported from China, Clifford sporadically found time to write articles for the general reader. Whether writing for scientific or 'popular' journals, however, Clifford took pride in keeping his technical jargon to the minimum. Anything he ever wrote was both readable and comprehensible.

Despite ample proof of his talents as a herpetological investigator, Pope resumed his studies at the American Museum as 'assistant' in the department of herpetology in 1926. He was finally promoted to the rank of assistant curator in 1928, and he had every reason to believe that he had a 'permanent' position at the museum. Meanwhile, Clifford had the great good fortune to meet Sarah Haydock Davis, who had been assisting G. Kingsley Noble in his experimental studies of salamanders. Clifford and Sarah soon discovered that they shared a great deal more than their interests in herpetology and they were married in 1929. "Sally", as Sarah was affectionately known to her friends, was soon helping with the work entailed in examining specimens, tabulating data, indexing the literature, and all the other drudgery that does into the preparation of a huge scientific report. She and Clifford collaborated on a study of the green pit-vipers of southeastern Asia, and they were co-authors of the report that appeared in 1933. Despite her invaluable assistance, invariably acknowledged by Clifford, Sally's name rarely again appeared as a co-author. This must have worried Clifford, for when his book, REPTILES ROUND THE WORLD, appeared in 1957 he felt impelled to explain that Sally had spent nearly as much time helping him as he had spent writing the book. Almost plaintively he added, "Her name is not with mine on the title page merely because she steadfastly refused to have it there."

Clifford had become well known as the author of several excellent books and pamphlets (the latter written for the New York Zoological Society) by the time he wrote that statement. Sally had been helping him for more than a quarter of a century. Nevertheless, they had gone through some lean years. The stock market had crashed the year of their marriage, but as a member of the scientific staff of a large, well established museum, Clifford may have felt secure. The economic situation deteriorated rapidly in the ensuing years, however, as thousands of banks failed in 1932 and 1933, and one worker out of every four was unable to find employment. Clifford was happily struggling to complete the manuscript for THE REPTILES OF CHINA when Franklin Roosevelt was inaugurated as President. Roosevelt's efforts to alleviate the unemployment situation by setting up the Works Progress Administration enabled Clifford to obtain assistance in his work. Museums, perennially understaffed, suddenly found themselves hard pressed to supervise the hordes of trained (and untrained!) individuals, technicians as well as secretaries, artists and scientists, that the federal government assigned to public institutions. Thanks in part to the help provided by the W.P.A., Pope managed to complete the text and assemble all the illustrations for THE REPTILES OF CHINA in 1934 and the volume appeared the following year.

This important contribution to our knowledge of the fauna of China established Pope as something more than a promising young herpetologist. Members of the American Society of Ichthyologists and Herpetologists expressed their esteem for Clifford Pope by electing him president of the organization in 1935. Unfortunately this year proved to be memorable for the

Popes for other reasons as well. For even though Clifford had achieved recognition in his field, he lost his position as assistant curator. Completion of his magnum opus had demanded that Clifford devote his efforts to the task. In doing so, however, Pope aroused the ire of G.K. Noble, who had become chairman of the Department of Herpetology in 1924. So it was that Clifford Pope, at the age of 36, in the throes of the Great Depression with a wife and three young sons to support, found himself without a job.

Where others facing adversity at the time were turning to the W.P.A. to solve such problems, Clifford paused to consider the situation as well as his talents and promptly adopted the course that seemed preferable to him. Writing for such magazines as Boy's Life, Natural History, and Asia, had whetted his desire to improve his literary style, and while carrying out his investigations of Chinese reptiles he had acquired a formidable knowledge of the herpetological literature. The technical literature was voluminous, but the few books on reptiles written for the amateur were mainly those of Raymond L. Ditmars, which offered little more than brief descriptions of the morphology and habits of individual species. Why not write something more like Noble's BIOLOGY OF THE AMPHIBIA, but without the technical jargon, and restricted to one group of reptiles? Clifford soon drafted an outline, and promptly set out to write the book that was still selling three decades later as SNAKES ALIVE AND HOW THEY LIVE. Even though herpetologists and specialists in other fields have greatly enhanced our knowledge of snakes since Pope's book appeared in 1937, it summarized much of what was known at the time. There is no satisfactory way of evaluating the impact of a book of the sort, but an authoritative, readable summary of a vast, scattered literature dealing with any topic almost inevitably opens the door to further investigation. And, Pope's book was not read exclusively by amateurs; the title continues to turn up in the bibliographies of books and articles written by experts.

Incredible as it seems in view of today's prices, Pope's well illustrated account of the snakes, the most authoritative book of its kind available in 1937, was sold at the bargain price of $2.50. Relatively few students could afford to buy such books during the depression years, but there was sufficient demand for Pope's book to induce the publisher to keep SNAKES ALIVE in print, and sales increased at a rapid rate as economic conditions improved. The scientific staffs at most museums were at minimum levels until after World War II, however, and few herpetologists could find positions in universities. If royalties from books failed to provide a handsome income for authors, the few assistant professors and assistant curators who could find jobs began at salaries ranging from $1,800 to $2,500. Even before the meager royalties began to arrive, Pope was busily combing the literature and preparing the text for THE TURTLES OF THE UNITED STATES AND CANADA.

Until this book appeared in print in 1939, no complete account of the American turtles north of Mexico existed. As more reliable sources of information became available, partly because authors with the requisite background were writing pamphlets and articles for zoos and museums, the demand for authoritative books dealing with amphibians and reptiles increased. At least three publishers began issuing handbooks, although Pope's book on turtles had been in print for more than a decade before Archie Carr's HANDBOOK OF TURTLES appeared. Each new book seemed to arouse more interest in herpetology, for the demand for Pope's books sometimes increased several years after they were published. Clifford was encouraged to continue his writing, but his next book, CHINA'S ANIMAL FRONTIER published in 1940, drew heavily on his experience as a collector in China.

Clifford's interest in the fauna of the country where he had begun his professional career never waned. He regretted having to abandon plans to include the amphibians in his reports of the Central Asiatic Expeditions, but he

remedied this omission to some extent by collaborating with a member of the staff at Yenching University in Peking, Alice M. Boring. Their resume of what was known of Chinese amphibians was published in Peking the year before Pope joined the staff of the Field Museum of Natural History as curator of the division of amphibians and reptiles in 1941.

This post had been vacated by Karl P. Schmidt, when he became the museum's curator of zoology. Karl had been a firm supporter of Clifford since the days when they were both at the American Museum of Natural History, and he was outraged when Clifford lost his job at this museum. Karl had impatiently awaited the opportunity to offer Pope a position in Chicago. The Popes moved to Winnetka, and Clifford enthusiastically resumed his research, at the same time writing non-technical articles for publications such as Field Museum News. Museums, eager to enlist the interest and support of the public, were no longer restricting their activities to exhibits and research. They were issuing their own publications addressed to the public and they demanded that curators write something besides their technical reports. Few curators were quite so well prepared as Clifford, whose informative, rather exhaustive booklet, AMPHIBIANS AND REPTILES OF THE CHICAGO AREA, was published in 1944.

Immediately following his arrival at the Field Museum Pope' s investigations dealt mostly with snakes. He carried out experiments designed to ascertain what might be the most effective means of treating bites from rattlesnakes, and later (with A.A. Zimmerman) he investigated the phenomena involved in the growth and development of the snake's rattle. Transportation had been a problem during the war years, and few herpetologists found it feasible to carry out much field work until a year or so after the war ended. When suitable vehicles became available there was a resurgence of Clifford's interest in salamanders. By now his three sons were old enough to help with field work, and the Pope family became a formidable team of collectors.

Clifford had been in his early forties when he accepted the position at Field Museum, which meant that he would reach retirement age before he had been employed by the museum long enough to be entitled to a normal pension. Anticipating that he could more profitably augment his income by preparing additional books, in 1953 Clifford resigned from the museum's staff to devote his efforts to writing.

During the 12 years that Pope served as curator he prepared nearly a score of articles for scientific journals, and he wrote chapters for two more or less technical books. In addition to preparing two sizeable pamphlets for the New York Zoological Society, Pope wrote a good many encyclopedia articles, and he was a frequent contributor to the publications the museum distributed to the public. Clifford never ceased worrying about the clarity of his writing, and he devoted considerable thought and effort to improving his style. He may have spent the better part of a year writing THE REPTILE WORLD, A NATURAL HISTORY OF THE SNAKES, LIZARDS, TURTLES, AND CROCODILIANS, which appeared in 1955, roughly two years after he had resigned his curatorship. Another two years had elapsed before REPTILES ROUND THE WORLD appeared as "A simplified natural history of the snakes, lizards and turtles," addressed to the tyro. These two books, as well as THE GIANT SNAKES, issued in 1961, were all published by Alfred A. Knopf. The year following their publication in the United States, these three books appeared in British editions published by the London-based firm of Routledge and Keegan Paul.

Even while working on his books, Pope usually wrote three or four articles a year, including biographical notes, and even articles dealing with raccoons and "the natural superiority of

pigs." Clifford was still living in Winnetka in 1957, when his good friend Karl P. Schmidt was bitten by a boomslang on the afternoon of September 25th. Karl carefully wrote down his symptoms during the ensuing hours until the following morning, but by noon on the 26th far more serious symptoms appeared that led to Karl's death three hours later. Karl's notes were incorporated in an account "Fatal bite of captive African rearfanged snake (Dispholidus)" that Pope wrote for Copeia, where it appeared in number 4 of 1958. Clifford served as the staff consultant on definitions of reptiles and amphibians for the Random House Dictionary of the English Language in 1966, and he occasionally wrote for encyclopedias after that. But by the early 1970's Pope's energy began to wane. By 1973 he must have realized that he lacked the strength to make much more use of his extensive library of books and reprints, which he sold to a museum in Los Angeles.

Few herpetologists ever had a better over-all grasp of the herpetological literature. Pope spent a fair percentage of his time going through bibliographies and indexes to the literature, and even more time reading and digesting what he found. His work in the field and laboratory revealed new species that he described, but he devoted more effort to writing readable summaries of what others had discovered than he spent on his own research. His niche in the field of herpetology is perhaps more aptly described as that of the synthesizer, even though he was a capable investigator. Beyond that Pope was an exceptional human being, with an intense interest in his fellow man. Where others would have been enraged at the stupidities and dishonesty of politicians or businessmen, Clifford more often viewed their acts with amusement, as human foibles or manifestations of human frailty.

Kathlyn Russell, who wrote a column for the newspaper in Escondido, California, where Clifford spent about a decade before he died, quite properly describes Clifford Pope as having been "affable, kind and soft-spoken", and those who knew Clifford will heartily agree with Mrs. Russell that "It was a pleasure and a privilege to have known Cliff---". During nearly four decades that I knew Clifford, I cannot recall ever having met anyone whom he might have considered an enemy. The world will surely be less without Clifford H. Pope.

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Gray Rat Snake, Elaphe obsoleta spiloides, Pope Co., Illinois. Photo by Stanley Dyrkacz.

CARL FREDERICK KAUFFELD

April 17, 1911 - July 10, 1974

Carl Kauffeld was one of those fortunate persons whose hobby was also his source of livelihood. His acquisition as a youth of Ditmars' "Reptile Book" stimulated his interest, as it did in the cases of so many of us of the same generation, and herpetology became his lifelong vocation and avocation.

Kauffeld was born in Philadelphia to parents of German descent, and he attended the public schools in that city. During his high school years he haunted the Academy of Natural Sciences, where he worked for a time as a volunteer in the department of entomology. He was also a very frequent visitor to the Philadelphia Zoo, where he soon became the friend of Robert Hess, also of German ancestry and who served as the reptile house keeper for 42 years. Young Carl was permitted to go behind the scenes and even to assist in the care of the collection, experiences which helped prepare him for his later long career in the husbandry of captive reptiles and amphibians. Kauffeld's interest in the Philadelphia Zoo remained so keen that he seldom failed to pay us a visit in later years when he made periodic excursions from New York to visit his parents.

When he was old enough to travel by himself he took public transportation from Philadelphia to the Pine Barrens in New Jersey, which in those days, even at their closest approach to the big city, were uncluttered by housing, shopping, and retirement developments. There he would hike all day, enjoying the solitude of the area and catching what he could.

Kauffeld's first professional employment in herpetology was as an assistant in the Department of Herpetology of the American Museum of Natural History in New York, where he served from 1930 until 1936. His escape from the brilliant, autocratic, and always suspicious Gladwyn Kingsley Noble, then head of the Department, came suddenly, and Kauffeld found himself in possession of a dream job - Curator of Reptiles in the brand-new Staten Island Zoo. That institution, the smallest of the five zoos eventually completed, one in each of New York City's five boroughs, was housed in a single building approximately half of the exhibition space of which was devoted to reptiles whereas the other half was divided among the mammals, birds, and fishes. Kuaffeld not only looked after the collection but he helped to plan and assemble it. The long series of longevity records he achieved, especially for snakes and many of which are still unchallenged, attest to his ability as a caretaker, which is all the more noteworthy in view of the fact that our knowledge of reptilian diseases and their treatment was in its infancy throughout most of his career. He developed an extraordinary interest in rattlesnakes and eventually was able to



Carl Frederick Kauffeld

exhibit living specimens concurrently of all the taxa of the genera Crotalus and Sistrurus indigenous to the United States.

Kauffeld's influence on young people interested in herpetology was enormous. First there were the men who served at one time or another as reptile keepers under his direction. Many of them have gone on to higher positions in the zoo, medical, or biological fields. Among them are John E. Werler, now Director of the Houston Zoo and formerly Curator of Reptiles of the San Antonio Zoo; David Zucconi, Director of the Tulsa Zoo; Louis Pistoia, Curator of Reptiles of the Columbus (Ohio) Zoo; Charles Hackenbrock, Professor of Anatomy at Johns Hopkins University; and Robert F. Mathewson, who was for many years Director of the Lermer Laboratories of the American Museum of Natural History on Bimini, the Bahama Islands. Many of the current staff members at the Staten Island Zoo also received their early training under Kauffeld, including James McNeish, Superintendent; William H. Summerville, General Curator; and Keepers Carl Alimonti, Robert Zappalorti, and Zigmund Leszczynski.

The Staten Island Herpetological Society, sponsored and guided by Kauffeld for a great many years, served as a stimulus for countless young people many of whom, under his influence, had their interest crystallized in the study of reptiles and amphibians. They include William G. Degenhardt, of the University of New Mexico; Carl Gans, of the University of Michigan; and Richard Highton, of the University of Maryland.

Field work was almost a passion with Carl Kauffeld, and he escaped from the growing and festering megalopolis of New York at every opportunity. He never lost interest in the New Jersey Pine Barrens, and he assembled masses of notes and records on the area that he graciously turned over to me for inclusion in my own review of the herpetology of the region in which I am once again actively engaged. Because of his great interest in rattlesnakes and his love of the area, Kauffeld made many field trips to the Southwestern United States, and in 1940 he undertood a relatively long collecting trip to northeastern Mexico and south to Mexico City.

Although he made several technical contributions to herpetological literature, most of Kauffeld's writing was in a popular vein and aimed toward the amateur and the public in general. He was a regular contributor to the News Bulletin of the Staten Island Zoological Society (later renamed "In Animaland") and to various amateur herpetological society newsletters. He authored three books, the first of which, published in 1937 and entitled "Snakes and their Ways", was with C. H. Curran, then Associate Curator in the Department of Entomology at the American Museum of Natural History. Kauffeld's two later books, "Snakes and Snake Hunting" (1957) and "Snakes: the Keeper and the Kept" (1969) had a profound influence on a small army of collectors and market hunters for the pet trade. Lured by his detailed descriptions of good collecting sites, scattered geographically from the Pine Barrens to the lowlands of South Carolina and the canyons of the Huachuca Mountains of Arizona, they descended on them, often in large numbers, and literally tore their surfaces to pieces in their eagerness to find specimens similar to those Kauffeld had obtained in earlier years. His pinpointing of choice localities earned him the scathing criticism of many conservationists, but inadvertently he may have done the herpetological fauna a favor by concentrating the depredations in a few places while equally productive nearby areas were spared from the pet and market hunters.

Kauffeld served in the Army Medical Corps during World War II. In 1963 he became Director of the Staten Island Zoo, a post he held until his retirement in 1973, after 37 years with that institution.

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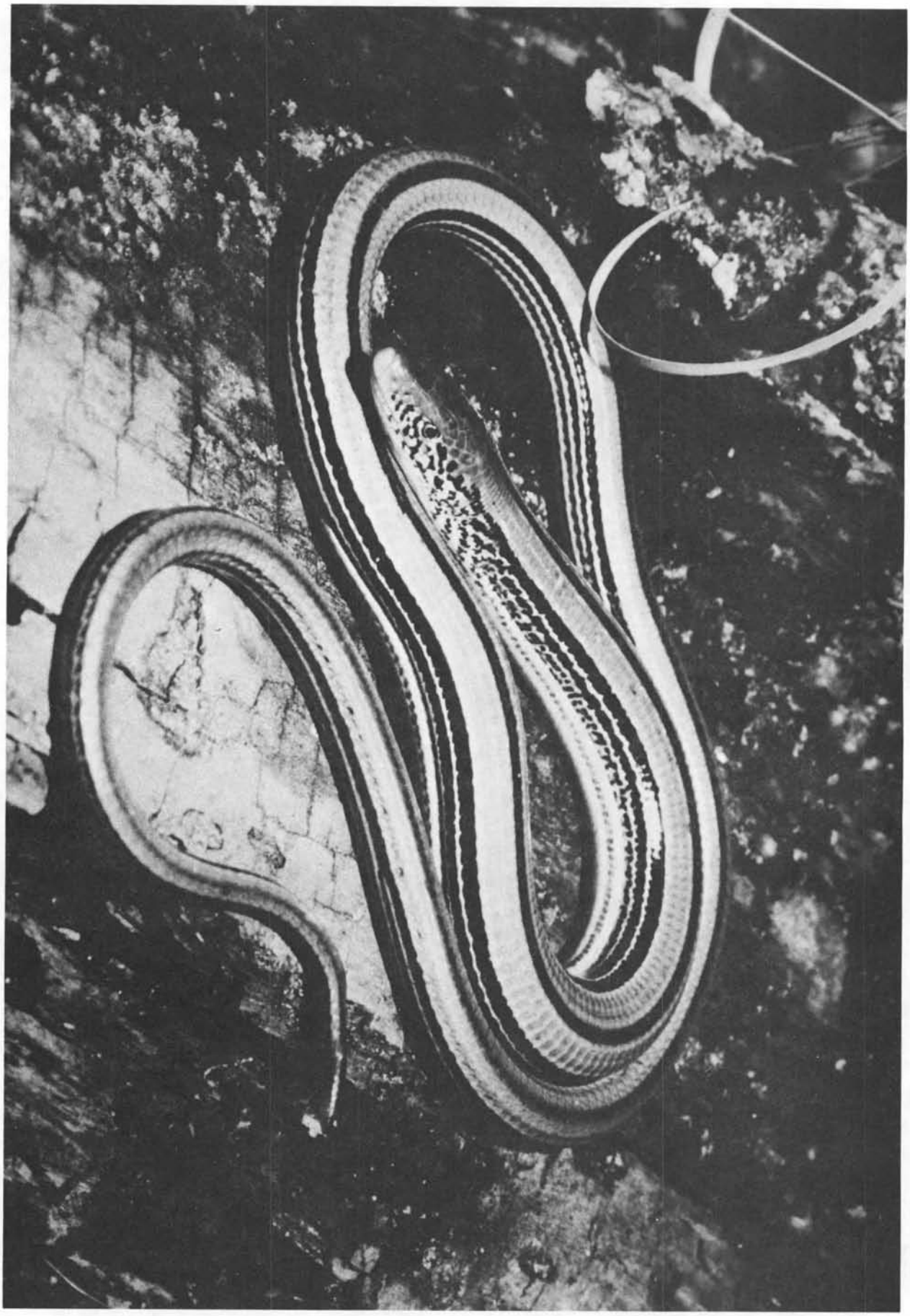
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Western Slender Glass Lizard, Ophisaurus a. attenuatus, Douglas Co., Kansas. Photo by Joseph T. Collins.



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CONTENTS

98 Letter to the Editor, by F. Harvey Pough

NEWS & COMMENT

99 More About the SSAR-HL Auburn University Meetings

100 SSAR Committee Assignments

108 SSAR Election Results

109 SSAR-HL Annual Meeting, 1975

ARTICLES

104 Bullfrog Eating a Bird, by Jeffrey Howard Black

105 A Xanthic Chrysemys scripta elegans, by Harrall C. Griffin, Jr.

107 Geographic Distribution

113 Current Titles

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"LETTER TO THE EDITOR"

Dear Sir:

A disturbing irony appeared in the most recent mailing from the SSAR. Two items shared the same envelope. Herpetological Review contained a report of a meeting that discussed the effects of conservation laws on herpetological research, and concluded with a statement emphasizing the need "to fully utilize any animal taken from the wild for research and public education purposes" (vol. 5, p. 42). The second item, the Journal of Herpetology, included a paper that reported the capture of 14,282 sea snakes in the Gulf of Thailand (vol. 8, pp. 201-210).

The stated goal of the research, which was supported in part by the Office of Naval Research, was collection of data concerning "the relative abundance of each species" and "The amount and toxicity of venoms obtained from each sea snake . . ." It seems improbable that all 14,282 snakes were fully utilized, especially considering that they were obtained in only three trips. If venom was really collected from all the snakes, it should supply the world's entire research needs for the foreseeable future.

The paper contained no clear statement of what happened to the snakes -- whether all were killed or some released alive, whether venom was extracted from every individual, whether the snakes were placed in a museum collection after venom was collected, or whether there were reasons for collecting so many snakes. The author of the paper did not reply to my letter to him raising these questions.

The SSAR, according to its Constitution, intends "To encourage conservation of wildlife in general and amphibians and reptiles in particular." Achieving this laudable goal will require some efforts that we are apparently not presently making. I suggest that it should be the Society's policy that the ecological impact of research be considered both when a project is planned and when a manuscript is submitted for publication. While it is not possible to draw a priori guidelines of what is and is not permissible to apply to all experiments or all experimental animals, it is possible, a posteriori, to identify work that has exceeded the bounds of what is reasonable and necessary.

Secondly, many biologists are conscientious in designing their research to make full use of the experimental animals and to minimize ecological impact. I think that these people deserve credit for their efforts -- a brief sentence in a paper noting the ultimate disposition of the experimental animals would help to accomplish that.

Although it is foreign to the ivory tower to allow such considerations as public opinion to influence our pure research, we must realize that the public attention we are trying to focus on the plight of endangered species will fall on our own experiments as well. If we do not practice what we preach, we risk losing the confidence of both the public and legislators, and dooming our conservation efforts to defeat.

F. Harvey Pough

10-18-74

MORE ABOUT THE SSAR-HL AUBURN UNIVERSITY MEETINGS (11-14 AUGUST 1974)

The Auburn University meetings were among the most pleasant ever held. Drs. Robert H. Mount and Geroge W. Folkerts served as co-chairmen. They treated those attending to some real hospitality and well organized meetings.

The SSAR Board met on the afternoon and evening of 11 August.

1) Potentially new publications or publication series were discussed and these included a translation series and a checklist for North American amphibians and reptiles.

2) The Board approved issuing 15 Catalogue accounts for six dollars. No time period is being stipulated for their issuance.

3) The meeting site for 1975 was approved and is California State University, Fullerton, California. The meeting Chairman is Dr. William Presch and the dates are 11-14 August.

4) Miami University of Ohio was considered as the 1976 meeting site.

5) Harry Greene, University of Tennessee, Knoxville won the SSAR Student Prize for his paper, "Defensive tail display by snakes and amphisbaenians. J. of Herpetology 7(3): 143-161.

6) SSAR membership (25 July 1974) included 1,202 individual & institutional members (63 life, 783 U.S., 104 foreign and 252 institutional).

7) SSAR provided $140 for the preservation of the Monte Verde Cloud Forest in Costa Rica, Central America.

8) A budget of $23,100 was adopted for 1975.

9) SSAR membership dues for 1975 are: $8 students, $10 regular members, $15 sustaining and $20 contributing.

10) The Nominating Committee announced the slate of candidates:

For Chairman-elect
James L. Vial
W. Ronald Heyer

For Director
John Wright
James Murphy

For Secretary
J. W. Edward Wortham
Stephen R. Edwards

For Treasurer
Henri Seibert

Other highlights of the Auburn meeting included:

1) a well attended symposium on "the long-term effects of ecosystem alterations on amphibian & reptile populations,"

2) a social which featured some impromptu swimming.

3) an excellent and well cared for live animal exhibit,

4) great food and conservation at the catfish fry in Chewacla State Park,

5) field trips to the Red Hills & Cheaha Mountains.

We extend a hearty "well done" to Drs.Folkerts, Mount, the Local Committee and all those wonderful Auburnites who worked so diligently to make these meetings a great success.

SSAR COMMITTEE ASSIGNMENTS - 1975

Local Committee 1975 Meeting
SSAR-HL Annual Meeting will be held at California State University, Fullerton, Calif., August, 1975.
Dr. W. Presch, Local Chairperson

Liaison with Regional Societies
James B. Murphy, Chairperson
Stanley Dyrkacz
Malvin Skaroff
Tom Johnson
Gopher Carlson
Michael Long

Membership Committee
NEED CHAIRPERSON

Financial Planning (Resources)
(not formed)

Society Publications
Kraig Adler, Chairperson (Facs.Repts.)
Henri Seibert (Publ. Sec.)
James Christiansen (Asst. Publ. Sec.)
J. P. Kennedy (J. Herp.)
M. A. Nickerson (Herp. Review)
R. G. Zweifel (Catalogue)
S. R. Edwards (Circulars)
C. G. Jackson (HL, Ex-Officio)

Facsimile Reprints Subcommittee
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R. Donoso-Barros
D. A. Rossman
A. H. Savitsky
Michael Tyler
J. W. Wright

Nominating Committee
C. J. McCoy, Chairperson
A. H. Brame, Jr.
J. R. Dixon
D. A. Rossman
A. H. Savitsky

Student Prize Committee
R. L. Bezy, Chairperson
Federico Achaval
M. J. Littlejohn

Future Meeting Sites (SSAR-HL)
F. S. Hendricks, Chairperson
(remainder of committee being revised)

Advisory Committee on Systematic Resources in Herpetology (joint ASIH, SSAR, HL Committee)
D. B. Wake, Chairperson
R. G. Zweifel, Vice Chairperson
H. C. Dessauer
Geo. Nace
Eric Pianka
G. B. Rabb
J. W. Wright
G. R. Zug
Rodolfo Ruibal

Recent Herpetological Literature
J. W. Wright, Chairperson
C. J. McCoy
W. R. Heyer
M. A. Nickerson

SSAR Committee on Common & Scientific Names
J. W. Wright, Chairperson
C. J. McCoy
J. T. Collins
S. R. Edwards (Ex-Officio)

Conservation Committee (joint SSAR, HL)
G. Folkerts, Chairperson
R. B. Bury, Vice Chairperson
H. W. Campbell, Vice Chairperson
R. McDiarmid, SE Coord.
Glenn Stewart, West. Coord.
R. A. Thomas, Plains Coord.
Allen Vinegar, NE Coord.
Rene Honegger, Internl. Coord.
C. Carpenter, Ex-Officio
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Wayne King
J. McCoy
Dean Metter
M. A. Nickerson
Norm Scott
Henri Seibert
Phil Smith
Dave Snyder

SSAR THANKS YOU!

Once again it is our pleasure to acknowledge those individuals who have helped the SSAR by becoming contributing or sustaining members. For the year 1974 we had 47 contributing members and 137 sustaining members. This response, which netted $613, was enough to cover the costs of our embryonic Circular program.

Henri C. Seibert

Contributing

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Williams, T. A. 50310
Wood, D. 15236
Worthington, R. D. 79968
Wright, J. W. 90007
Young, D. H. 37055
Zappalorti, R. 10310
Zegel, J. 30083
Zenisek, C. J. 15701



What say we just send out for pizza?

THE SSAR CONSERVATION FUND

The following members contributed to the SSAR's Conservation Fund thereby enabling us not only to get this program started but also to make a modest contribution to the Monteverde Cloud Forest Preserve (Herp. Rev. 5:8). It is never too late to contribute to this worthy project. - H.C.S.

Abercrombie, C. L.	5.00
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Bury, R. B.	35.00
Campbell, H. W.	5.00
Cooper, J. E.	10.00
Cowles, R. B.	20.00
Czajka, A.	7.00
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Murphy, R. W.	1.00
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Stewart, G. R.	2.00
Weaver, J. A.	25.00
Wis. Herpetological Society	12.00
Worthington, R. D.	1.00

NEW SOCIETY

A new herpetological society has been organized for the Western Massachusetts area. Dues are $5.00 per year and anyone interested in joining the society is requested to apply to:

W.M.H.S.
Box 151
Highland Station
Springfield, Mass. 01109
Attn: Jan Thompson

"SHARE AND LEARN" SYMPOSIUM IS SUCCESS

On the third weekend in July, herpetologists from four states attended a series of meetings in Louisville, Kentucky, sponsored by the Kentucky Herpetological Society. A total of over fifty individuals were involved in the two days of activities. The topic of the conference was "Share and Learn", and was aimed at encouraging herpetologists to join in dialogue for mutual benefit.

The first meeting was held on Saturday, July 20 at the University of Louisville. Tom Collins of the University of Kansas and Burt Monroe of the University of Louisville shared some of the current problems in the herpetology of Kentucky and encouraged work in several areas. Mike Douglas, University of Louisville, and John MacGregor, University of Kentucky, both presented slide presentations on some of the work which they have recently done in the state. This was followed by a tour of University of Louisville's collection of living and preserved specimens.

Sunday's (July 21) activities began with a field trip to a woodland pond in Bernheim Forest, south of Louisville. This very active pond has been the subject of intense study by Mike Douglas, who guided us through some of his research procedures.

The climax of the weekend was the regular monthly meeting of the Kentucky Herpetological Society. The keynote speaker, Dr. Sherman A. Minton, Jr., assisted by his wife, Madge, gave an excellent presentation on the surprising, if not unassisted mobility of many species of the world's herpetofauna.

This two day symposium gave everyone involved a chance to acquaint themselves with some of the work being done and need for additional research in Kentucky herpetology. In addition, it gave all a chance to get acquainted with each other, colleagues in a common task. The group departed with a pledge to continue such get-togethers.

William W. Milstead, 46; Professor of Biology, University of Missouri - Kansas City, died 29 November, succumbing to the effects of a lifetime of diabetes. Author of more than 40 articles and books, he is best known for his contributions to evolution in box turtles (Terrapene) and lizard ecology. He was a life member of the A.S.I.H. Board of Governors, 1961-1966), H.L. (Executive Council, 1966-1969) and S.S.A.R. (Board of Directors, 1970-1973).

ANNOUNCEMENT

PRACTICAL HUSBANDRY, MEDICINE, AND SURGERY OF CAPTIVE REPTILES

A 2-day intensive course for veterinarians, personnel in research and educational institutions, herpetologists, zoological garden keepers, and sophisticated amateurs concerned with health care of reptiles is being offered 8-9 March 1975 at the American Museum of Natural History, Central Park West at 79th Street, New York City.

Lecture and discussion topics include husbandry, medicine, pathology, and surgery. The instructor, Fredric L. Frye, D.V.M., is noted specialist in veterinary care of reptiles. His book "Husbandry, Medicine and Surgery of Captive Reptiles" will be available to course participants at a reduced price.

Pre-enrollment is advised to assure participation. The course fee is $60, but a reduced fee of $50 will be available to members of the Herpetologists' League and/or of the Amer. Soc. of Ichthyologists and Herpetologists.

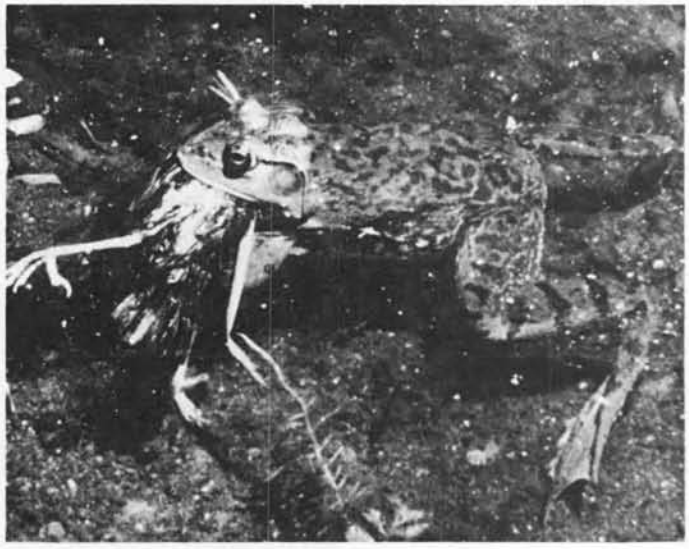
For application forms and further information contact:

Nathan W. Cohen, Director
Curriculum Development in Science
University Extension
2223 Fulton Street
Berkeley, California 94720
Telephone: (415) 642-1061

BULLFROG EATING A BIRD

The Bullfrog, *Rana catesbeiana*, is a well-known frog with a voracious appetite, always ready to eat whatever it can get. The following observations were made between Corvallis and Albany, Benton County, Oregon. A movement in shallow water along the margin of a small pond was noticed. Investigation showed a solitary bullfrog about two feet from the sandy shore with the posterior half of a bird hanging from its mouth. The bullfrog was in floating and emergent aquatic vegetation and did not move as photographs were taken. The total length of the bird was approximately equal to the snout-vent length of the bullfrog. No apparent difficulty in swallowing the bird was noted. Attempts to capture the bullfrog resulted in its retreat to deeper water with neither bullfrog nor bird being collected. Dr. George M. Sutton, University of Oklahoma, identified the bird as probably a juvenile Red-winged Blackbird.

Jeffrey Howard Black
Department of Biology
Oklahoma Baptist University
Shawnee, Oklahoma 74801



A Xanthic *Chrysemys scripta elegans*

Albinism (Cagle, 1947; Hensley, 1959) and melanism (Viosca, 1933; Carr, 1952; McCoy, 1968) have been described from the turtle *Chrysemys scripta*. Xanthism has not been previously reported from this species. A xanthic juvenile *Chrysemys scripta elegans* (49 mm carapace length) was collected 15 June 1973 at the Darrell Saul Minnow Farm, 3 mi. E. Des Arc, Prairie County, Arkansas and given to Griffin (Fig. 1). Kodachromes of the turtle were sent to Ernst for identification. The turtle is alive and in the possession of Griffin.

Instead of the typical green to olive, the ground color of the carapace is bright yellow, especially the cervical, marginals, and pleurals. The amount of yellow pigment is less on the vertebrals, but is still greater than usual. The carapacial pattern is reversed from normal with light green markings bordered by dark green on a yellow background instead of yellow markings on a darker background. The plastron and bridge coloration and pattern are normal.

The head pattern is atypical as the red postorbital stripes are enlarged and spread dorso-medially with the left fusing posteriorly with a broadened, red, prefrontal arrow. The postorbital stripes widen posteriorly and extend well onto the neck where they are separated dorsally by a narrow, green bordered, yellow stripe. Anteriorly the postorbital stripes move dorsally over the eyes. There is also a large red spot behind and above the right eye. The pigmentation of the eye, underside of the chin and neck and limbs is normal.

Fig. 1. Xanthic Chrysemys scripta elegans from Prairie County, Arkansas.

LITERATURE CITED

CAGLE, FRED R. 1947. Color abnormalities in *Pseudemys scripta troostii* (Holbrook). Nat. Hist.Misc. (6):1-3.

CARR, ARCHIE. 1952. Handbook of turtles. Cornell Univ. Press, Ithaca, N.Y. pp. 1-529.

HENSLEY, MAX. 1959. Albinism in North American amphibians and reptiles. Publ. Mus. Michigan St. Univ. Biol. Serv. 1(4):133-159.

McCOY, C.J. 1969. The development of melanism in an Oklahoma population of *Chrysemys scripta elegans* (Reptilia: Testudinidae). Proc. Oklahoma Acad. Sci. 47:84-87.

VIOSCA, PERCY, JR. 1933. The *Pseudemys troostii - elegans* complex, a case of sexual dimorphism. Copeia 1933 (4) : 208-210.

HARRALL C. GRIFFIN, JR. and
CARL H. ERNST
554 Jeanne Drive, Memphis, TN 38109 and
Department of Biology, George Mason University, Fairfax, Virginia 22030



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GEOGRAPHIC DISTRIBUTION

CAUDATA

EURYCEA LUCIFUGA (Cave salamander). U.S.A., Indiana, Vanderburgh Co., 2 mi W Evansville; 13 June 74; Lodato, Winternheimer, Prectel and Flittner. M. J. Lodato. Univ. Michigan Mus. Zoo., UMMZ 133295-6. First record for county; indicates occurrence of relict population in the hiatus between uplands in south central Indiana and extreme southern Illinois. Submitted by MICHAEL J. LODATO, Middle Mississippi Valley Herpetologists, 925 Park Plaza Dr., Evansville, In 47715.

SALIENTIA

BUFO OLIVACEOUS (Baluchistan coastal toad). IRAN, Strait of Hormoz, Hormoz Island; 25 March 1974; R. G. Tuck. R. Khaza'ie and R. G. Tuck. Muze-ye Melli-ye Tarikh-e Tabi'i, MMTT 499500. First record of amphibian for island. Submitted by ROBERT G. TUCK, Jr., Muze-ye Melli-ye Tarikh-e Tabi'i, Department of the Environment, P.O. Box 1430, Teheran, IRAN.

BUFO SURDUS LURISTANICUS (Lorestan toad). IRAN, Khuzistan Province, 6 kilometers W Pol-e Jeh Jeh; 21-22 March 1974; D. M. Lay. R. Khaza'ie and R. G. Tuck. Muz . Mel. Tar. Tab., MMTT 218-220. Third known locality, others being the type locality in Lorestan Province and Masjed-e Suleiman in Khuzistan (Eiselt, J., Ann. Naturhistor. Mus. Wien, (1973) 77: 181-243). Submitted by ROBERT G. TUCK, Jr.

GASTROPHRYNE CAROLINENSIS (Eastern narrow-mouthed toad). U.S.A., North Carolina, Guilford Co., 5 mi N Greensboro, Guilford Courthouse National Military Park; 7 August 1974; K. L. Becker, H. T. Hendrickson and J. E. Wiley. W. Palmer. North Carolina State Mus. Nat. Hist. NCSM 14082. First record for county, extends North Carolina range into the northern Piedmont. Submitted by H. T. HENDRICKSON, Department of Biology, University of North Carolina at Greensboro, Greensboro. NC 27412

HYLA SQUIRELLA (Squirrel treefrog). U.S.A., North Carolina, Guilford Co., 5 mi N Greensboro, Guilford Courthouse National Military Park, 7 August 1974; K. L. Becker, H. T. Hendrickson and J. E. Wiley. W. Palmer. North Carolina State Mus. Nat. Hist., NCSM 14083. First record for county, extends North Carolina range at least 80 mi W of the Fall Line into the central Piedmont. Submitted by H. T. HENDRICKSON.

RANA MACROCNEMIS PSEUDODALMATINA (Iranian long-legged wood frog). IRAN, Gilan Province, between Asalem and Khal-Khal (Heroabad); 10 May 1974; R. Khaza'le, M. Thireau, K. Kimball and R. G. Tuck. R. Khaza'ie and R. G. Tuck. Muz. Mel. Tar. Tab., NMTT 44951. Previously known from five specimens from type locality in Mazandaran Province. Submitted by ROBERT G. TUCK, Jr.

SAURIA

COLEONYX VARIEGATUS (Banded gecko). MEXICO, Gulf of California, Baja California del Sur, Isla Coronados, SW end, 27° 07' N 111° 17' W; 25 May 1970; S. C. Williams, V. F. Lee. R. W. Murphy. California Acad. Sci., CAS 127459. The juvenile gecko appears similar to C. v. slevini in all respects except in having four instead of three gular scales in contact with the first infralabials; first record for this island. Submitted by ROBERT W. MURPHY, Department of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118.

CYRTODACTYLUS SCABER (Keeled rock gecko) IRAN, Strait of Hormoz, Hormoz Island; 31 March 1974; A. Ahmadi. R. Khaza'ie and R. G. Tuck. Muz. Mel. Tar. Tab., MMTT 228-229. First record of any lizard for Hormoz Island. Submitted by ROBERT G. TUCK, Jr.

LACERTA TRILINEATA MEDIA (Median three-lined lizard). IRAN, Loristan Province; Oshtrankuh Protected Region, Dare Asbar; 13 May 1974; R. Khaza'ie, M. Thireau and R. G. Tuck. R. Khaza'ie and R. G. Tuck.

Muz. Mel. Tar. Tab., MMTT 458-459. First record for Loristan Province. Submitted by ROBERT G. TUCK, Jr.

PHRYNOSOMA MODESTUM (Round-tailed horned lizard). U.S.A., Texas, Zapata Co., H. B. Zachry Randado Ranch, 26 mi NE Zapata; 25 October 1970, 19 July and 25 September 1971; J. H. Everitt and I. Higginbotham. A. H. Chancy. Texas A and I Univ. collection, TAIC 2238, 2671, 2679. The first known record for southern Texas extends the range southward approximately 175 miles from Kinney Co. record (Raun and Gehlbach, Dallas Mus. Nat. Hist. Bull. (1972)2). Submitted by JAMES H. EVERITT, USDA, Agricultural Research Service, P. O. Box 267, Weslaco, TX 78596.

SCELOPORUS UNDULATUS CONSOBRINUS (Southern prairie lizard). U.S.A., Arizona, Pima Co., 10.6 Km SSE Arivaca; 19 March 1972; S. F. Hale. S. F. Hale. Univ. Arizona, Dept. Zool., UAZ 37828. First record west of Santa Cruz River basin in southern Arizona extends range westward approximately 90 mi. Submitted by STEPHEN F. HALE, 1449 E Tenth St., Tucson, AZ 85719.

SERPENTES

COLUBER RHODORHACHIS (Cliff racer). IRAN, Strait of Hormoz, Hormoz Island; 25 March 1974; R. G. Tuck. R. Khaza'ie and R. G. Tuck. Muz. Mel. Tar. Tab., MMTT 516. First colubrid record for Hormoz Island. Submitted by ROBERT G. TUCK, Jr.

ECHIS CARINATUS (Saw-scaled viper). IRAN, Strait of Hormoz, Hormoz Island; 23 September 1973; M. T. Farvar, R. B. Nehring. R. G. Tuck. Muz. Mel. Tar. Tab., MMTT 118. First viperid record for Hormoz Island. Submitted by ROBERT G. TUCK, Jr.

LYTORHYNCHUS RIDGEWAYI (Afghan owl-headed snake). IRAN, Semnan Governorate, Dasht-e Tal, ca. 30 Km SSE Shahrud; 25 April 1974; R. Khaza'ie, M. Thireau, J. Nouri and R. G. Tuck. R. Khaza'ie and R. G. Tuck. Muz. Mel. Tar. Tab., MMTT 279-280. First record for north central Iran. Submitted by ROBERT G. TUCK, Jr.

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11 - 14 AUGUST 1975

CALIFORNIA STATE UNIVERSITY, FULLERTON

Tentative Schedule of Events:

17 Aug., Sunday	- 1200-1600	- Registration, SSAR Board Meeting (1600)
18 Aug., Monday	- 0800-1200	- Registration
	- 1300-1630	- Contributed Papers and/or Symposia
	- 2000- ??	- Evening Social
19 Aug., Tuesday	- 0900-1200	- Contributed Papers and/or Symposia
	- 1330-1530	- Contributed Papers and/or Symposia
	- 1600-1800	- SSAR Business Meeting
	- 1800-2100	- Informal Dinner
20 Aug., Wednesday	- 0900-1200	- Contributed Papers and/or Symposia
	- 1330-1630	- Contributed Papers and/or Symposia
21 Aug., Thursday	- Field Trips	

All meetings are scheduled on the Cal. State Univ., Fullerton Campus. Dormitory facilities adjacent to campus are available. They consist of rooms with private bath facilities. The fee schedule is based on the number of room occupants per day and is as follows: one - $6.00, two - $7.00, three - $9.00, and four - $11.00. Several moderately priced motels are within three to five miles of the campus. Dining facilities will be available at the dormitory. A meal package is available for Sunday dinner through Thursday breakfast for $20.00 (11 meals), ALL you can eat! Several restaurants are within easy walking distance of the campus.

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Is this paper to be considered in the Student Prize Competition? ____yes, ____no.

Abstract: Type abstract (100 words maximum) on a separate sheet of white paper. Restrict abstract to one paragraph headed by the name(s) of the author(s) and title of paper. Paragraph should be no wider than 105 mm. and double spaced.

Return this form and abstract by 1 June 1975 to JOHN W. WRIGHT, SECTION OF HERPETOLOGY, NATURAL HISTORY MUSEUM, LOS ANGELES, CALIFORNIA 90007.

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1974. "Gifkikkers, parels van de tropische regenwouden" (deel 2).
AQUARIUMWERELD 27(7):139-142, 5 fig.

ZWINENBERG, A.J.
1974. The leatherback (Dermochelys coriacea), one of the largest living reptiles.
BULL MARYLAND HERP SOC 10(2):42-49.

ZWINENBERG, A.J.
1974. Goniocephalus boydii, eine Agame aus Australien.
DAS AQUARIUM 8(63):404-405.

ZWINENBERG, A.J.
1974. Australische reptielen XII (slot): Scincidae, literatuurlijst.
LACERTA 32(12/IX):195-200.

ZWINENBERG, A.J.
1974. "De Soepschildpad".
SPIEGEL DER NATUUR 5(3):86-90, 5 fig.

CARIBBEAN RESEARCH

MARGARET M. STEWART (Dept. of Biological Sciences, State University of New York, 1400 Washington Ave., Albany, New York 12222) is currently conducting research on niche breadth and competitive interactions between sympatric species of Jamaican Eleutherodactylus. Investigations include habitat specializations, spatial relationships, food habits, reproductive potential, and possible character displacement for species pairs. Special attention is being given to ecological relationships between two introduced species, E. johnstonei and E. planirostris, and how they co-exist with native species assemblages.

- - - - - - - - - - - - - - - - - -

CARL H. ERNST (Dept. of Biology, Geroge Mason University, Fairfax, Virginia 22030) has initiated a taxonomic study of the genus Rhinoclemys. He hopes to eventually expand the project into an ecological study of R. punctularia on Trinidad.

****

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REQUEST FOR LIVE HYLA

Conrad Weiler (Institut für Humangenetik und Anthropologie der Universität Freiburg, 78 Freiburg im Breisgau, Albertstrasse 11, Freiburg, Germany) needs 10-30 live individuals of Hyla versicolor and 10-30 live individuals of either H. andersonii, H. regilla, or H. chrysoscelis. The animals may be sent by air mail, C.O.D. and payment will be made for the individual animals. He would also like information on maintenance of Hyla in captivity(breeding, food, temperatures, etc.).

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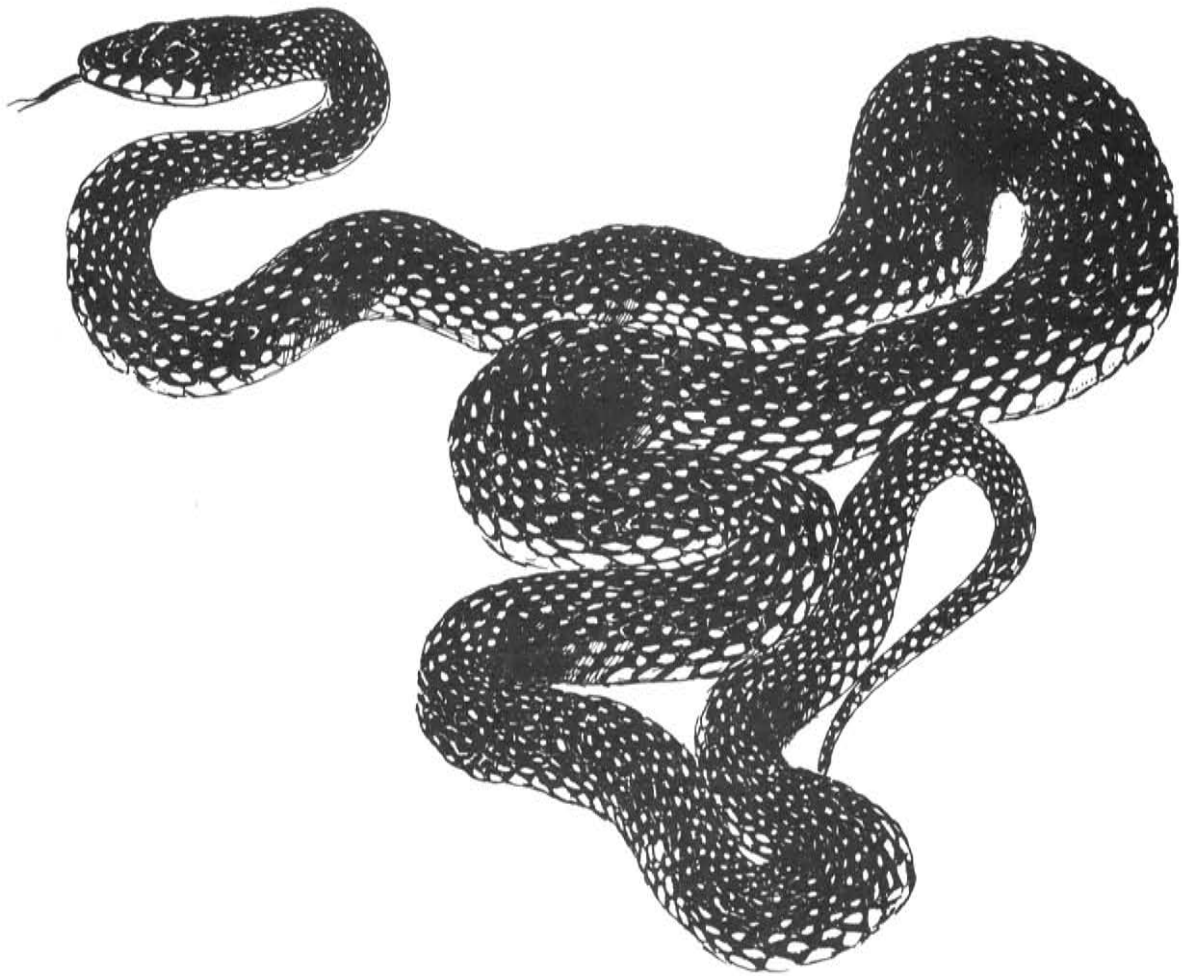
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BACK COVER

Typhlotriton spelaeus, Grotto Salamander (adult) from Missouri. Photo: Joseph T. Collins, Museum of Natural History, University of Kansas, Lawrence, Kansas.





HERPETOLOGICAL REVIEW

VOLUME 5, NUMBER 3
SEPTEMBER, 1974

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Herpetological Review

VOLUME 5, NUMBER 3

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CONTENTS

HERPETOLOGY AT THE UNIVERSITY OF CHICAGO 68

GEOGRAPHIC DISTRIBUTION 69

STATISTICS OF CHRYSEMYS RUBRIVENTRIS HATCHLINGS FROM MIDDLESEX COUNTY, VIRGINIA
by Joseph C. Mitchell 71

NEW PUBLICATIONS 72

ABSTRACTS OF PAPERS PRESENTED AT THE 1974 SSAR-HL MEETINGS AT AUBURN UNIVERSITY, AUBURN, ALABAMA 73

THE SIGMA XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1973-1974 AND 1974-1975 IN "HERPETOLOGY" 80

INDIVIDUALS AND INSTITUTIONS 81

CURRENT LITERATURE 82

NEW ADDRESSES 95

MISCELLANEA 96

FRONT COVER: Drawing of Speckled King Snake, Lampropeltis getulus holbrooki, by Roberta Plummer, MPM Artist.

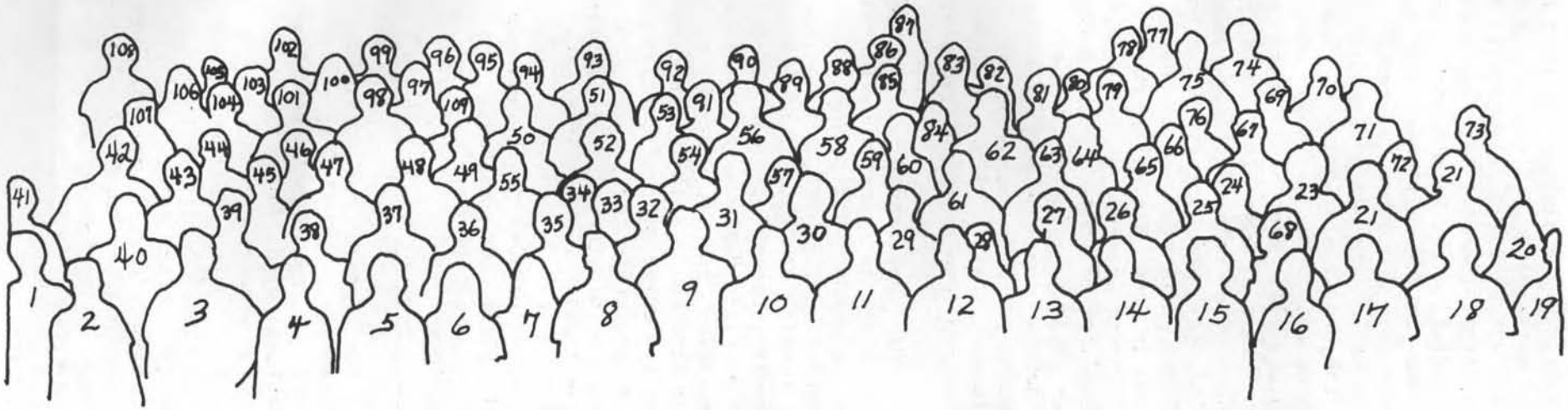
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SSAR-HL Meeting at Auburn University, 12-14 August, 1974.





1. Jim Christiansen, 2. Mrs. Gary Packard, 3. Chuck Carpenter, 4. Elinor Benes, 5. Alan Savitsky, 6. Mrs. A. Savitzsky, 7. Martha Crump, 8. Sheldon Guttman, 9. Max Nickerson, 10. Doug Rossman, 11. Wayne Seibert, 12. Harold Dundee, 13. Jaime Villa, 14. Julian Harrison, 15. Mrs. Joe Tihen, 16. Mrs. Paul Cupp, 17. Paul Cupp, 18. Kelly Thomas, 19. Jim Keller, 20. Jebbie Brockus, 21. Dick Fanz, 22. Donald Smith, 23. Thomas Berger, 24. Rebecca Pyles, 25. Joe Tihen, 26. Michael Corn, 27. Terry Vandeventer, 28. Sue Pillasch, 29. Ray Burkett, 30. George Labanick, 31. Alvan Karlin, 32. Mike Christensen, 33. Libby Tomson, 34. Mrs. Ray Wiggs, 35. Ronn Altig, 36. Jack Fouquette, 37. Dean Metter, 38. Paul Maslin, 39. Gary Packard, 40. Ray Ashton, 41. Ralph 42. Jim Murphy, 43. ? 44. Tom R. Johnson, 45. Jerry Jackson, 46. Dan Watson, 47. William Parker, 48. Bob Herrington, 49. Ray Pawley, 50. Bill Degenhardt, 51. Ralph Axtell, 52. Greg Mengden, 53. Max Hensley, 54. Jim Berry, 55. Ray Wiggs, 56. Henri Seibert, 57. Don Merkle, 58. George Renwick, 59. Craig Weatherby, 60. Paul Sattler, 61. Don Gartside, 62. Dave Snyder, 63. Doug Taylor, 64. Jill Auburn, 65. Jim Vial, 66. Debby Casebere, 67. Mac Shealy, 68. Dale Jackson, 69. Kraig Adler, 70. Ken Fahey, 71. Clement Counts, 72. Kenneth Dodd, 73. Bob Mount, 74. Herbert Harris, 75. Jim Dixon, 76. ? 77. Terry Graham, 78. Harry Greene, 79. Eric Juterbock, 80. little Freeman boy, 81. Mrs. Jack Freeman, 82. little Freeman girl, 83. Jack Freeman, 84. Mrs. Rick Blaney, 85. Rick Blaney, 86. George Zug, 87. little Zug girl, 88. Roger Sanderson, 89. John Godley, 90. George Pisani, 91. Mrs. Steve Christman, 92. Gary Smith, 93. Steve Christman, 94. Ralph Jordan, 95. Robin Russell, 96. Pat Mawhinney, 97. Kevin Clubb, 98. Dick Worthington, 99. John Iverson, 100. Mrs. John Iverson,.101. Richard Coulter, 102. Mike Plummer, 103. Sue Justis, 104. Tom Collins, 105. Mrs. Mike Plummer, 106. Marcia Starns, 107. Mary Dawson, 108. Steve Edwards, 109. Dick Montanucci.

The key to the picture had to be made out from memory and we apologize to those whose names we were not sure about or may have mixed up.

Eight papers were candidates for the Herpetologists League Student Prize competition at the SSAR-HL meeting at Auburn University, Alabama, on 14 August. The HL Student Prize Committee, consisting of Roy McDiarmid, George Zug and Joseph T. Collins (chairperson) voted to award the $25.00 prize to Richard C. Vogt for his presentation entitled "Systematics of the Graptemys pseudogeographica complex." Mr. Vogt is a student at the University of Wisconsin. The committee further congratulates James F. Berry, University of Utah, and Steven P. Christman, University of Florida, for their high quality papers in the student prize competition.

HERPETOLOGY AT THE UNIVERSITY OF CHICAGO

The professional herpetological staff at the University of Chicago has increased rapidly in the past few years. There are now six faculty members actively studying the biology of amphibians and reptiles.

Steve Arnold, Asst. Professor, Dept. of Biology, is investigating the courtship behavior of salamanders and the ecology and evolution of feeding preferences in snakes. Robert Inger, who is currently President of American Society of Ichthyologists and Herpetologists and a lecturer in the Committee on Evolutionary Biology, is studying the structure and organization of communities of reptiles and amphibians in tropical forests. Eric Lombard, Asst. Professor of Anatomy, is studying hearing in frogs in order to understand the morphological bases of acoustical communication in anurans. He is also pursuing studies on the functional morphology of feeding and locomotion in salamanders. Hy Marx is a lecturer in the Committee on Evolutionary Biology as well as Curator of Herpetology at the Field Museum of Natural History. His time is divided by curatorial activities and collaborative studies with Harold Voris and George Rabb on the phylogeny of sea snakes, vipers, and other "advanced" groups of snakes. The Chicago Zoological Park (the Brookfield Zoo) is George Rabb's home base and, although administrative activities keep him quite busy, he maintains Lectureship posts in both the Committee on Evolutionary Biology and the Dept. of Biology at the University. Along with studies on snake phylogeny George and his wife Mary continue research on the evolution of breeding behavior of frogs. Richard Wassersug is an Asst. Professor in the Dept. of Anatomy where he works on morphology, ecology and behavior of amphibian larvae. His primary emphasis is on feeding adaptations of tadpoles.

The University of Chicago has cooperative programs with many other schools and institutions in the Chicago area. It is not uncommon for graduate students at the U. of Chicago to do their research at the Brookfield Zoo, the Field Museum or some more distant location such as Borneo or Guatemala. Herpetology students currently enrolled at the University of Chicago are working on projects that range from the limb anatomy of terrestrial salamanders to the feeding biology of Natrix. Students interested in studying herpetology at the University of Chicago may enroll in the Dept. of Anatomy, the Dept. of Biology or the Committee on Evolutionary Biology.

The Senate has passed a bill to designate 49,097 acres in southern Virginia as the Great Dismal Swamp National Wildlife Refuge. A 40% interest in the property was donated by the Union Corp., which plans to donate the remaining 60% interest over a four-year period. The refuge will include Lake Drummond, located near the center of the Great Dismal Swamp, which comprises about 385,000 acres between Norfolk, Va. and Elizabeth City, N.C. (The Milwaukee Journal, 8 Sept. 1974)

GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW publishes brief notices of new geographical records in order to make them available to workers in published form. The STANDARD FORMAT for a record is:

SCIENTIFIC NAME (Common name). Locality (air-line distance to nearest town); date; collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY. address.

Please submit new records in STANDARD FORMAT (short manuscripts are acceptable when data cannot be adequately presented in standard format) to Geroge R. Zug, Division of Amphibians and Reptiles, National Museum of Natural History , Washington, DC 20560.

Recommended citation: Jones, J. 1974. Geographic Distribution: Rana pipiens . Herpt. Rev. 5(1):1.

CAUDATA

AMPHIUMA MEANS (Two-toed amphiuma). U.S.A., Virginia, Hanover Co., 2 miles N. Mechanisville; 5 March 1974; Wayne A. Fussel. J.C. Mitchell. Virginia Commonwealth Univ., VCU 326. An approximate 20 mile range extension to the north of the previously known northern most locality in New Kent Co., Va. (Salthe, Cat. Amer. Amphib. Rept., 1973: 148.1). Submitted by JOSEPH C. MITCHELL, 3200 Stuart Ave., Apr. 2, Richmond, VA 23221.

SALIENTIA

RANA AREOLATA CIRCULOSA (Northern crawfish frog). U.S.A., Arkansas, Craighead Co., about 4 miles NE Jonesboro; 12 March 1973. W. Bryd, E.L. Hanebrink. E. L. Hanebrink. Arkansas State Univ., ASU 1289-92. Extends the range across the Mississippi River into northeastern Arkansas. Submitted by WILLIAM BYRD and EARL L. HANEBRINK. Division of Biological Science, Arkansas State University, State University, AR 72467.

TESTUDINES

KINOSTERNON FLAVESCENS FLAVESCENS (Yellow mud turtle). U.S.A.,Missouri, Barry Co., 5.6 kilometers W Exeter; 6 June 1964; C. Balch, D. Smith. D. Smith. University of Missouri-Kansas City, UMKC 726. Second specimen recorded from Missouri and extends the range 80.5 km SE of the original Jasper Co. record (Anderson, 1965, Reptiles of Missouri). Submitted by DONALD D. SMITH, Department of Biology, University of Missouri-Kansas City, Kansas City, Missouri 64110 and LON C. BALCH, Naturalist-Ranger, Lake of the Ozarks State Park, Kaiser, Missouri 65047.

SAURIA

EUMECES GILBERTI ARIZONENSIS (Arizona skink). U.S.A. Arizona, Mohave Co., Burro Creek, ca 2450 ft. about 15 kilometers W Bagdad; 6 April 1974; P.A. Medica. P.A. Medica. Arizona State Univ., ASU 14486. Extension of the range approximately 79 kilometers to the west. First record for county. Additional Arizona records are: Yavapai Co., Alkaline Spring, 1.3 k E Castle Rock, ca 2464 ft., Santa Maria Mts., 7 July 1972. R.D. Ohmart. R.D. Ohmart. ASU 14509. Yavapai Co., Willow Spring, ca 5000 ft., Santa Maria Mts., 4 July 1972. R.D. Ohmart. R.D. Ohmart. ASU 14508. Extends the known range approximately 40 k to the WNW. First records for the Santa Maria Mts. Yavapai Co., 16 k E Crown King, ca 3000 ft., Bradshaw Mts., June 1973. L.J. Vitt. L. J. Vitt. Not preserved.

Extends the known range approximately 45 k SE to the eastern slopes of the Bradshaw Mts. Submitted by PHILIP A. MEDICA, P.O. Box 495, Mercury, NV 89023 and LAURIE J. VITT, Department of Zoology, Arizona State University, Tempe, AZ 85281.

SERPENTES

CARPHOPHIS AMOENUS HELENAE (Midwest worm snake). U.S.A., Indiana, Franklin Co., Franklin County Park, at Brookville; 13 April 1974; M.H. Kerr. M. J. Lodato. Univ. Michigan Mus. Zoo., UMMZ 133294. First record for county; establishes northern limit of distribution for extreme eastern Indiana. Submitted by MICHAEL J. LODATO, Middle Mississippi Valley Herpetologists, 925 Park Plaza Dr., Evansville, IN 47715.

MASTICOPHIS BILINEATUS BILINEATUS (Sonora whipsnake). U.S.A., Arizona, Mohave Co., Burro Creek, ca 2450 ft. about 15 kilometers W Bagdad; 7 April 1974; P.A. Medica, B. G. Maza. P. A. Medica. Arizona State Univ., ASU 14488. Extension of the range approximately 136 kilometers to the west. First record for Mohave County. Submitted by PHILIP A. MEDICA and BERNARDO G. MAZA, P.O. Box 495, Mercury, NV 89023.

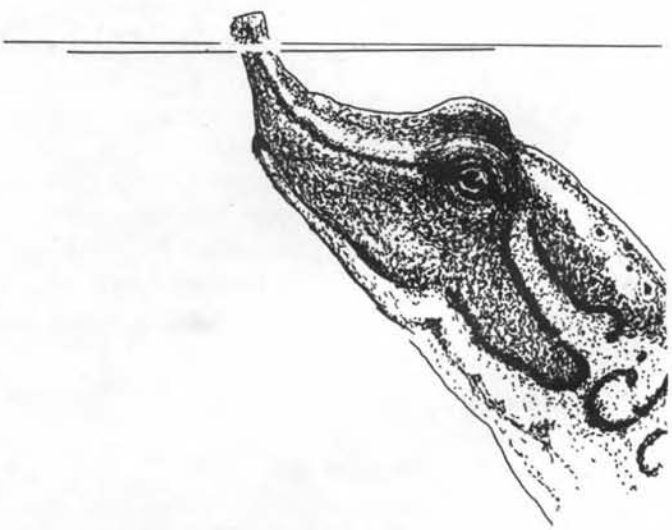
NATRIX TAXISPILOTA (Brown water snake). U.S.A., Virginia, Chesterfield Co., 10 miles SE Richmond, Presquile Wildlife Refuge; 22 January 1974; S. Jackson. J. C. Mitchell. Virginia Commonwealth Univ., VCU 165. 16 April 1974; C.R. Blem, C.R. Blem. VCU 372-373. Range extension of approximately 20 miles west of the previously known most northern locality in New Kent Co., Va. (Virginia Herp. Soc. range map). Submitted by JOSEPH C. MITCHELL.

TROPIDOCLONION LINEATUM LINEATUM (Northern lined snake). U.S.A., Missouri, Miller Co., near Iberia; 4-5 May 1974; J. P. Ward. J. P. Ward. Collection of J.P. Ward, JPW S107-109. First specimens from central Missouri (specimens reported in Herp. Review 5(2) lost in transit); in rocky debris after heavy rain. Submitted by JOSEPH P. WARD, 212 Allen, Goldsboro, NC 27530.

Albino Toad Found in Michigan - Continued

The albino Bufo americanus found by a four year old in Warren, Michigan and subsequently given to the Amphibian Facility of the University of Michigan, initiated unusual activity by teenagers in that area. A total of 14 "albino" Bufo americanus have been found. Most were found within a few blocks of the original animal. Others were within an area 15 miles in diameter. The animals are apparently from the 1973 mating season and pose some interesting questions either of gene flow in the Rouge River and Red Run water shed or of sibling dispersal in the heart of the metropolitan Detroit area. The animals are currently under examination and it is premature to detail the nature of their albinism. It is anticipated that progeny may be obtained in the not too distant future.

George W. Nace
University of Michigan



Snorkel nose of soft-shell turtle, Trionyx ferox. (Drawing by Roberta Plummer, MPM).

STATISTICS OF CHRYSEMYS RUBRIVENTRIS HATCHLINGS FROM MIDDLESEX COUNTY, VIRGINIA

Few data are available on hatchlings of Chrysemys rubriventris. Carr (1972) stated the shell length is 30-32 mm. Graham (1971) gave the following data on four hatchlings of C. r. bangsi from Plymouth, Mass.: mean carapace length of 30.1 mm (29.3-31.0), mean plastron length of 28.5 mm (28.1-29.3) and mean weight of 7.7 g. (6.9-7.9). The only data from Virginia are on egg size, these averaging 19 x 25 mm depending on size of the female (Smith, 1904).

On 13 April 1974, sixteen C. rubriventris hatchlings were collected from Middlesex County, Virginia, 3.5 miles SE of Saluda. The nest was in sandy loam on the edge of a dirt road ca. 250 meters north of the Piankatank River. Three hatchlings had already emerged upon discovery and excavation revealed 13 others, some in a state of stupor, 15 cm from the surface. The entrance was in the shape of a slot approximately the size of the hatchlings. None of them bore yolk sac remains or a caruncle although umbilical scars were present.

Fifteen of the hatchlings were made available to the author five days after capture. Measurements were taken with Helios dial calipers, metric tape and a triple beam balance. These data are summarized in Table 1.

A comparison of the data with that of Carr (op. cit.) and Graham (op. cit.) shows an average difference in carapace length of 5 mm, plastron length of 5 mm and weight of 1.7 g. This, along with the emergence date, supports the statement by Ernst and Barbour (1972) that this species "...may overwinter in the nest and emerge in the spring".

ACKNOWLEDGMENTS: I thank W. C. Rothery for providing the turtles and Drs. C.R. Blem, J.F. Pagels and G.R. Zug for criticizing the manuscript. One specimen was donated to the Virginia Commonwealth University Vertebrate Collection, VCU 418, and the others released.

LITERATURE CITED

Carr, A. F. 1952. Handbook of Turtles. Comstock Publ. Assoc., Ithaca, New York. 542 p.

Ernst, C. H. and R. W. Barbour. 1972. Turtles of the United States. University Press of Kentucky. 347 p.

Graham, T. E. 1971. Eggs and hatchlings of the Red-bellied turtle, Chrysemys rubriventris, from Plymouth, Massachusetts, J. Herp., 5(1-2):59-60.

Smith, H.M. 1904. Notes on the breeding habits of the Yellow-bellied turtle. Smithsonian Misc. Coll., 45:252-253.

Joseph C. Mitchell
Dept. of Zoology
Arizona State University
Tempe, Arizona 85281

Table 1. Statistics of Chrysemys rubriventris hatchlings. (SE = one standard error, measurements in millimeters, weight in grams, N = 15).

	MEAN	SE	RANGE
Height	16.5	0.1	15.8 - 17.5
Carapace length	35.5	0.3	33.2 - 37.5
Carapace width	36.8	0.4	33.8 - 39.3
Curved length	38.7	0.3	36.0 - 41.0
Curved width	42.1	0.3	40.0 - 44.0
Plastron length	33.5	0.4	30.0 - 36.0
Plastron width anterior to bridge	20.6	0.2	19.1 - 21.8
Plastron width posterior to bridge	19.6	0.2	18.2 - 20.6
Head width	10.1	0.1	9.6 - 10.6
Weight	9.4	0.2	7.9 - 10.9

NEW PUBLICATIONS

The REVISTA DE BIOLOGIA TROPICAL, published by the Universidad de Costa Rica, has just issued the second part of its 21st volume (dated May 1974), which features several herpetological papers: on helminth parasites of Nevada bullfrogs (Babero & Golling), on Costa Rican coral snakes (Savage & Vial), and geographical distribution of Costa Rican venomous snakes (R. Taylor et al.). Herp papers total some 85 of the 250 pages of the present issue. Other articles of interest to vertebrate biologists include plasma protein microelectrophoresis of some poeciliid fishes, behavior of Poecilia latipinna, Mexican cichlid fishes, and food habits of some Costa Rican bats.

The Revista de Biologia Tropical (Journal of Tropical Biology) was started in 1953 by the Universidad de Costa Rica and, unlike most Latin American scientific journals, it has appeared twice yearly with hardly any interruptions. Although initially the Revista was heavy with tropical medicine and parasitological papers, the present emphasis seems to be on taxonomic and ecological papers of tropical plants and animals, although occasionally papers on extra-tropical taxa appear. Many of the papers published in the Revista are the result of research done by participants in the Organization for Tropical Studies (OTS) program or by University of Costa Rica staff, although these affiliations are by no means prerequisite for publication in the Revista.

In past years, the Revista has published papers by many herpetologists, including Carr, Caldwell, Duellman, Greding, Heyer, Kluge, Thomas, Tamsitt, Savage, Schwartz, Valdivieso, Vial and Villa. Many factors have attracted authors --from many countries-- to submit manuscripts to the Revista. It is a reasonably old, respected journal, with a well known, elegant, format. Papers are usually well edited, and painstaking attention is given to the smallest details of presentation. Submission-to-publication time varies, but usually it is about a year for short papers (10 p. or less). Longer papers, and color plates, may be subsidized to expedite publication. Authors receive 100 free reprints if they are regular subscribers, 50 if not. Subscription costs $5.00 a year, and additional reprints usually cost less than half than they would in the US. The main disadvantage is the delay due to mailing which is about 3 months for Costa Rica-US surface mail (air mail delivery can be arranged).

Jaime Villa
Cornell University

AMPHIBIANS: Guidelines for the Breeding, Care, and Management of Laboratory Animals. 1974. National Academy of Science, Wash., D.C., 153 p.

The Subcommittee on Amphibian Standards of the National Research Council has reviewed the literature on amphibian culture and has produced an excellent synthesis of our knowledge. Anyone keeping live frogs and salamanders will find the guide an invaluable aid in keeping healthy amphibians. The coverage is best shown by listing chapter heading and some of their subsections: 1) Introduction; 2) Classification and description of amphibians commonly used for laboratory research; 3) Definition and description of experimental amphibians; 4) Sources-selection; dealer care; ordering, shipping and receiving; legal aspects; 5) Physical facilities - relation to natural habitat; amphibian quarters; enclosures; 6) Amphibian management and laboratory care; 7) Breeding; 8) Records and information control - identification of individuals; 9) Amphibian medicine - bacterial diseases: viral diseases; parasitic diseases; mycotic diseases; euthanasia and anesthesia; 10) Personnel; Appendices on endangered amphibians and control law by states and Canadian provinces; References. Copies of this guide can be purchased for $5.25 from National Academy of Sciences Printing and Publishing Office, 2101 Constitution Avenue, Washington, D.C. 20418.

George Zug
National Museum of Natural History

The following are abstracts of papers presented at the 1974 SSAR-HL meetings at Auburn University, Auburn, Alabama, 12-14 August 1974.

* * * * * * * * * * *

BERRY, JAMES F. (University of Utah). Character convergence in the musk turtles, Sternotherus minor and S. odoratus, in northern Florida.

Populations of Sternotherus minor and S. odoratus were compared between five localities where the species were ecologically allopatric and two localities where they were ecologically sympatric. It was determined that the species compete for food resources at localities where they are sympatric since they overlap considerably in resource utilization and do not partition resources spacially or temporarily. S. minor loses its specialized mollusk-eating adaptations and becomes morphologically similar to S. odoratus at localities where the species are sympatric, or where the snail Goniobasis is not available as a food source. It is suggested that "character convergence" has been demonstrated.

* * * * * * * * * * *

CHRISTEIN, DEBRA R., and DOUGLAS H. TAYLOR (Miami University of Ohio). Social facilitation in celestial orientation of Rana catesbeiana tadpoles.

Four different groups (n=1; n=10; n=20; and n=40) of bullfrog tadpoles (R. catesbeiana) were trained underneath the sun to a specific shoreline, simultaneously but in separate training tanks. All groups were tested individually in an aquatic outdoor circular orientation arena at periodic intervals for a period of twenty days. Learning curves were then constructed for each group with respect to time required to learn the shoreline associations. Our data indicate that the number of individuals in a training group has a definite effect on the rapidity of learning new shorelines with increased numbers having an inhibitory effect on learning rate.

* * * * * * * * * * *

CHRISTMAN, STEVEN P. (University of Florida). Giant rattlesnakes and skeletal morphometrics.

A multivariate method for allocating isolated snake precaudal vertebrae to the correct vertebral region is introduced. There is a direct relationship between the length of a snake and the length of its mid-body vertebrae. The holotype of Crotalus giganteus is a mid-body vertebra, and came from a snake approximately 1.9 meters (six feet, three inches) in length.

As the size of a rattlesnake increases, vertebral width increases faster than vertebral length. A simple model relating vertebral dimensions to body size is presented. Under the assumptions of this model, vertebral width should increase with body weight, while vertebral length should increase with body length.

* * * * * * * * * * *

CORSE, WAYNE, MARK BAUMAN and DEAN METTER (University of Missouri, Columbia) The economic impact of two herps on a fish hatchery.

Studies of Rana catesbeiana and Natrix sipedon on a fish hatchery showed that these two species consume fish in large enough quantities to be of economic consideration to the hatchery. Both species feed most heavily on the more valuable, slower moving goldfish in preference to faster swimming fish.

DODD, C. KENNETH, JR., and EDMUND D. BRODIE, JR. (Clemson University). Anti-predator mechanisms in selected members of the neotropical salamander Genus Chiropterotriton with comments on the effects of temperature on the immobile response.

Four species of the neotropical salamander genus Chiropterotriton (bromeliacia, didmidiatus, multidentatus, picadoi) were studied for possible anti-predator mechanisms. Based on the Central American Chiropterotriton, characterized by coil-uncoil flipping and the Mexican Chiropterotriton, characterized by a running flip. The effect of temperature on the immobile response and repeated immobilization were studied for C. multidentatus. The duration of immobility tended to be quadratic, with shortest immobility at 12°C and greatest immobility at 4°C and 20°C. Repeated immobilization resulted in neither an increase nor a decrease in the duration of immobility. Evidence for noxiousness of C. multidentatus will be presented.

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DYRKACZ, STANLEY, and MICHAEL J. CORN (McHenry, Illinois and Grayslake, Illinois). Response of naive, neonate bullsnakes to water extracts of potential prey items.

Previously unfed, newly hatched bullsnakes (Pituophis melanoleucus sayi) from northeastern Illinois were tested for their responses to water extracts of twelve potential prey species. Positive response, significantly increased tongue flicking, was found only for chipmunk, field mouse, and baby chicken. It is suggested that house mice and rats are not chemically recognized because they are recently introduced species. It is also suggested that, because of visual cues, a prey item can be recognized even though chemical cues are lacking; and that visual cues can override chemical cues to cause rejection of unsuitably sized prey. Order of presentation of extracts did not influence the strength of the response, as has been reported for Elaphe.

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FOUQUETTE, M. J., JR. (Arizona State University). Character displacement, and reinforcement of an isolating mechanism, in chorus frogs.

The basis for assuming mating call is the overriding isolating mechanism in sympatric species of Pseudacris is briefly reviewed, and further evidence submitted. Mating calls of Pseudacris nigrita and Pseudacris triseriata feriarum were analyzed from Florida to Kentucky, including areas of sympatry and allopatry. Divergence in sympatry in at least one species in four parameters of calls is interpreted as an example of reproductive character displacement. Pulse rate appears to be the critical parameter upon which females discriminate, and the highly significant displacement in that parameter is interpreted as reinforcement of the primary premating isolating mechanism.

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FRANZ, RICHARD, and WALTER AUFFENBERG. (University of Florida). The gopher tortoise in Georgia.

Gopherus polyphemus distribution in Georgia is a series of small disjunct populations south and east of the Fall Line, confined to long-leaf pine-turkey oak communities. Both Gopherus and the plant community distribution can be correlated with Late Tertiary and recent sand deposits.

Many populations are threatened; few have recently been extirpated. Some problems facing Gopherus are: 1) removal of tortoises by humans for food; 2)construction reducing the availability of suitable habitat; 3) widespread continual use of trail bikes in these communities is killing many plant components essential to soil stabilization and tortoise food (esp. wire grass), and resultant dry, shifting sand is unfavorable for burrow construction; and 4) fire elimination in many areas results in maturing of turkey oaks causing thick leaf litter accumulations, retarding growth of wire grass and other low-growing food plants; thus reducing the tortoises' primary food supplies.

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GUTTMAN, SHELDON I. (Miami University of Ohio). Isozymes in northern allopatric populations of the American toad, Bufo americanus.

Electrophoretically demonstrable variation was analyzed in enzymes encoded by 14 structural gene loci in 620 individuals representing 25 populations. Average individual heterozygosity was 11.6%, mean percentage of loci polymorphic was 25.7%, and average number of alleles detected per locus was 1.45. Extensive clinal variation in allelic frequencies and genic variability estimates was observed. Marginal populations of this species appear to be as variable as central populations. American toad possesses more genic variability than any other vertebrate species reported to date. This may be a reflection of an adaptive strategy unique to toads. (Supported by NSF Grant GB-23601)

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HILLESTAD, HILBURN O., ROBERT J. REIMOLD, ROBERT R. STICKNEY, HERBERT L. WINDOM, and J. H. JENKINS (University of Georgia, Athens) (Savannah, Georgia). Pesticides, heavy metals and radionuclide uptake in loggerhead sea turtles from South Carolina and Georgia.

Loggerhead sea turtle (Caretta caretta) eggs from three nesting beaches in Georgia and South Carolina were analyzed for chlorinated hydrocarbons and heavy metals. Tissue samples were obtained from Georgia turtles for radionuclide analysis. Total DDT (DDE + DDD + DDT) residue levels ranged from .058 ppm to .305 ppm. Dieldrin residue levels ranged from trace to .0564 ppm. Mercury levels in yolks ranged from 0.02 ppm to 0.09 ppm and 0.01 ppm to 0.03 ppm in the albumen. Zinc levels averaged 32.25 ppm in yolk and 26 ppm in the albumen. There were significant differences between the yolk and albumen levels of cadmium, copper and lead. Cadmium levels averaged 0.17 ppm in yolk and 0.56 ppm in albumen; copper levels averaged 2.08 ppm in yolk and 6.0 ppm in albumen; lead averaged 2.87 ppm in yolk and 12.0 ppm in albumen. Radionuclide detection for the gamma emitters revealed very low levels in tissue samples. Levels were found to be much lower, by several orders of magnitude, than in other coastal reptiles, mammals and fish.

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JUDD, FRANK W. (Pan American University of Texas). Activity and home range ecology of the keeled earless lizard, Holbrookia propinqua.

A field study of the ecology of the keeled earless lizard, Holbrookia propinqua, was conducted from July 1969 to September 1971 on study areas situated on South Padre Island, Cameron County, Texas. H. propinqua is active throughout the year, but activity is limited to relatively warm days in winter. Diel activity is bimodal during clear, hot days and unimodal during cool days. Males move significantly farther per hour than females due to the fact that males move farther per move rather than more often than females. Home range size was estimated by minimum polygon and probability density function methods. Both methods showed male home ranges to be larger than those of

females. Juvenile home range size was similar to that of adult females. Information on temporal variability of home ranges and the relation of home range size to vegetational cover and population density are presented.

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JUSTIS, C. SUE, and DOUGLAS H. TAYLOR (Miami University of Ohio). Extraocular photoreception and compass orientation in larval bullfrogs, Rana catesbeiana.

Eyeless larval bullfrogs (Rana catesbeiana) possess extraocular photoreceptors (EOP's) for perception of celestial cues for spatial orientation. It appears that the pineal gland (epiphysis cerebri) and the frontal organ (stirnorgan) are the effective EOP's utilized in this response. Additionally, both of these EOP's are capable of perceiving photo-period changes for purposes of biological clock synchronization.

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McDIARMID, ROY W., W. RONALD HEYER, and DIANA L. WEIGMANN (University of South Florida, National Museum of Natural History and University of Kansas). Tadpoles, predation and pond size in the Tropics.

Tadpoles involved in predator-prey interactions were studied under laboratory and field conditions in tropical wet forest in Costa Rica. Larvae of Leptodactylus pentadactylus and naiads of the odonate Pantala flavescens are important predators on larvae of several species of frogs. Feeding experiments elucidated the nature of the predator-prey interactions. Interestingly, both predators and prey are inhabitants of small ephemeral puddles. A model is used to illustrate the relationships between predation and pond size as they affect the composition of the tadpole community. The predatory feeding mode of tadpoles is considered in light of this model.

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MILLER, KIRK, and GARY C. PACKARD (Colorado State University). Altitudinal variation in critical thermal maximum of chorus frogs (Pseudacris triseriata).

Critical thermal maxima (CTMs) were determined for chorus frogs collected along an altitudinal gradient running from the piedmont of northcentral Colorado to high park-lands in the Front Range of the Rocky Mountains. There is an inverse, linear correlation between CTM of chorus frogs and altitude. Since montane habitats are characterized by generally cooler conditions than are piedmont and intermediate localities, the reduction in CTM of chorus frogs with increasing elevation presumably represents an outcome of physiologic adaptation by the frogs to their respective thermal environments. A relatively low CTM may indicate that rate-limiting enzymes in intermediary metabolism function optimally at relatively low body temperatures.

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REDMOND, WILLIAM H., and ROBERT H. MOUNT (Auburn University). Amphibians and Reptiles of coastal plain affinity found within the Coosa Valley, Appalachian Ridge and Valley Province, Alabama.

Within the Appalachian Ridge and Valley province, the Coosa Valley stretches from northeastern to central Alabama. It is approximately 125 miles long and varies from 5 to 30 miles wide. Nine species of amphibians and reptiles which are usually associated with the Coastal Plain have been reported to occur within the Coosa Valley. The zoogeographical significance of the presence of these 9 species will be discussed and interpreted in terms of present ecological conditions and past geological events.

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ROSE, FRANCIS L.(Texas Tech University). Tumorous growths on A. tigrinum associated with treated sewage effluent.

Neotenic Ambystoma tigrinum inhabiting the treated sewage effluent pond at Reese AFB (Hurlwood, Texas) have the highest tumor rate of any reported populations. Thirty three per cent of the animals have one or more of six basic types of growths. Samples of 30,000 larvae from non-sewage ponds have failed to yield a single individual with an external growth. Current evidence indicates that the causitive agent may be a polycyclic hydrocarbon.

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SANDERSON, ROGER A. (University of South Florida). Sexual dimorphism in Malaclemys barbouri.

Sexual dimorphism and growth in the Barbour's Map turtle was studied in the field and laboratory from 1971 through 1973. Emphasis was placed on differences in growth rate, form of the shell and skull and food habits. Significant differences in several characteristics were found between males and females of the same size. At maturity females are more than twice the size and six times the age of males. Increase in reproductive potential, combined with differential food utilization, are postulated as the main selective forces determining dimorphism in this species.

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SATTLER, PAUL, and SHELDON GUTTMAN (Miami University of Ohio). An electrophoretic analysis of the melanistic phase of the Eastern garter snake Thamnophis sirtalis sirtalis.

Within the range of Thamnophis s. sirtalis is an area which has garter snakes exhibiting a high frequency of melanism. Melanistic specimens as well as normally-colored specimens from sympatry and allopatry were examined with the technique of horizontal starch gel electrophoresis. The results will be discussed, and may indicate the degree of gene flow between the color morphs. Also to be discussed are possible mechanisms of selection for the black color morph.

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SHEALY, ROBERT M. (Pensacola Jr. College). Reproduction in the Alabama Map turtle, Graptemys pulchra, in Alabama.

In Alabama Graptemys pulchra, males reach sexual maturity in about 3 years and females in about 14 years. Mature females average over 10 times the weight of mature males. Male courtship behavior is apparently similar to that in other aquatic emydines, except that the "titillation tool" is the snout of the male rather than the fore claws. Reproductive potential varies from 7 to 71 (Ave.=29), depending on the size of the female. Nesting occurs from May through July, with the deposition of from 1 to 6 clutches of eggs per female per season. Predators (raccoons and crows) destroy over 95% of the nests in some areas. Incubation requires about 76 days. An interval of from several days to a week occurs between hatching and emergence of hatchlings from the nest. No evidence of hatchlings overwintering in the nest has been found.

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SMITH, DONALD D. (University of Missouri at Kansas City). Population structure, growth and reproduction of two species of Cnemidophorus; one unisexual and one bisexual.

During the summers of 1968 and 1969 certain aspects of the life history of two species of Cnemidophorus (C. gularis Baird and Girard, a bisexual species and C. exsanguis Lowe, reproducing via parthenogenesis) were studied near Alpine, Brewster County, Texas. Sex ratios were equal for C. gularis and no male C. exsanguis were found. C. exsanguis reached reproductive maturity at the age of about ten months, but most of the female C. gularis did not reach maturity until their second reproductive season. There was a direct relationship between snout-vent length and clutch size, and old adults of both species probably laid two clutches of eggs.

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SMITH, GARY C. (Furman University). Assimilation efficiencies of ectothermic vertebrates.

Assimilation efficiencies were measured for three lizard, four snake and one toad species. Domestic crickets, southern toads and a strain of laboratory mice were the food items offered. All values for food and feces were converted to caloric equivalents for comparison. Gut clearance ranged from a low of 1.8 days for Cordylus warreni, the armadillo lizard, on a diet of crickets to 7.1 days for Bufo terrestris on the same diet. Assimilation percentages ranged from 60.9 percent for Eublepharus macularis on a cricket diet to 88.9 percent for the corn snake, Elaphe guttata on a mouse diet. Assimilation percentages were not affected by temperature or amount of food consumed per feeding. Efficiences were related primarily to the specialization of each species on particular food items.

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STARNS, MARCIA and DOUGLAS H. TAYLOR (Miami University of Ohio). Sun compass orientation in the red-spotted newt, Notopthlamus viresdecens.

Red-spotted newts were trained to a particular compass direction outdoors in training tanks having an artificial shore at one end and water at the other end. The animals were periodically removed from the water and placed upon the shore where they were allowed to find their way back to water. Orientation tests in an aquatic circular arena, from which only celestial cues were visible indicated that these newts were capable of sun compass orientation and that their orientation was directed toward deep water, i.e. in a direction that would have returned them to deep water had they been in the training tank.

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TIHEN, JOSEPH A. (University of Notre Dame). The fossil frog genus Miopelodytes.

Miopelodytes has previously been known only from the type specimens, from the middle Miocene of Nevada. Additional specimens, consisting mostly of dissociated bones, from the Oligocene of Nevada and the lower Miocene of Montana, confirm the relationship of Miopelodytes to the modern genus Pelodytes. Some features of the fossils resemble Eopelobates and/or discoglossids. Confirmation of the familial relationships of the fossils along with reexamination of morphological features of the modern genus, leads to interesting paleozoogeographic and phylogenetic speculations.

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VIAL, JAMES L. (University of Missouri, Kansas City). Thermal related activity in the mesoamerican lizard, Gerrhonotus monticolus.

Studies on temperature correlated activity in G. monticolus were conducted on the Cerro de la Muerte of Costa Rica at elevations above 2,780 m. Over a body temperature range of 8.6° to 27.2°C

this lizard is active only above 20.2°C, and is entirely diurnal. Close correlation is demonstrated between body and substratum temperatures. Comparisons with other gerrhonotine lizards indicate that G. monticolus has the highest voluntary minimum temperature within the group for which information is available, while its overall thermal range is intermediate to other Gerrhonotus.

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VIAL, JAMES L. (University of Missouri, Kansas City). Demographic characteristics of a Kansas population of copperheads (Agkistrodon contortrix).

Applications of quantitative methods to a population of Agkistrodon contortrix are used to develop life tables, survivorship curves, fertility tables and generation time. The derivation of these biological characters, based upon a study by H.S. Fitch, is used as an example by which the existing herpetological literature may be exploited to generate data on biological phenomena not included in the original report.

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VOGT, RICHARD CARL (University of Wisconsin, Madison). Systematics of the Graptemys pseudogeographica complex.

The confusion among herpetologists regarding the taxonomy of the false map turtle complex G. p. kohni, G. p. pseudogeographica, G. p. ouachitensis, and G. p. sabinensis has made much of the ecological and life history data for this group unreliable. Head patterns, shell markings, shell measurements, skeletal anatomy, habitat separation, geographic distribution, food partitioning, and blood protein structure are being examined. Data regarding the external morphology and distribution are presented. One population in the Mississippi River in Wisconsin was studied intensively. Morphological data were collected from 808 adults and 50 clutches of young from known females in this population. In addition 1740 specimens were examined from throughout the entire range of this group. Data analyzed to date suggest that G. p. pseudogeographica and G. p. kohni are one species distinct from G. p. ouachitensis and G. p. sabinensis. Morphological characters are presented to separate the two groups.

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WEATHERBY, CRAIG A. and SHELDON I. GUTTMAN (Miami University of Ohio). Population Genetics of the Queen Snake, Regina septemvittata.

An attempt was made, utilizing horizontal starch gel electrophoresis, to determine the genetic differentiation between populations of Regina septemvittata. Of particular interest were the isolated populations of this species. Approximately 20 animals were taken from each of six populations. Gravid females were sacrificed after they gave birth and the young of these broods were also analyzed.

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ZEMKO, RONALD G. (Miami University of Ohio). The occurrence and distribution of turtles in Ohio.

An extensive survey of museum collections, college and university teaching collections, and material collected by professional herpetologists revealed significant changes in the distribution of Ohio's chelonian herpetofauna during the last quarter century. Since the publication of Roger Conant's 1951 edition of The Reptiles of Ohio, at least one previously overlooked species (Graptemys pseudogeographica) was added to the list of Ohio's turtles, and the distribution of previously existing species was shown to be significantly altered. Ranges of individual species have been diminished by spreading urbanization, environmental deterioration, and habitat destruction. Numerous range extensions, reported since 1951, were verified.

THE SIGMA XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1973-74 AND 1974-75 IN "HERPETOLOGY"

Awards for 1973-74

STEVAN J. ARNOLD, University of California, Santa Barbara. Courtship behavior in Guatemalan salamanders of the family Plethodontidae. $150.

FRANKLIN G. HEMPEL, Duke University Medical Center. Fluorescence spectra of isolated frog retina. $150.

JAMES S. JACOB, University of New Mexico. Biotelemetric monitoring of activity patterns and physiological parameters of three species of Crotalus in New Mexico. $200.

CHARLES E. KROON, University of Chicago. A functional morphological investigation of the feeding mechanism of colubrid snakes. $125.

LYNNE M. MILLER, Rutgers University. Nesting behavior of a southern population of diamondback terrapins. $150.

JOHN D. RAMER, Virginia Polytechnic Institute and State University. The relationship of mating call quality of Rana clamitans to territorial behavior and sexual selectivity. $350.

FREDERICK C. SCHLAUNCH, Cornell University. The ecology of amphibians and reptiles in urbanizing regions. $100.

CARLA S. WOODWARD, Northern Michigan University. Colonization patterns and ecology of the vertebrate fauna of the Huron Islands, Lake Superior. $200.

Awards for 1974-75

RALPH A. ACKERMAN, University of Florida. The effects of nest packing and clutch size on incubation time and mortality of sea turtle eggs. $100.

JANETTE R. CUSHMAN, Colorado State University. Growth of juvenile boreal toads (Bufo boreas) in relation to temperature and ration size. $100.

JEFFREY H. DELSON and JAMES F. REYNOLDS, New Mexico State University. The population dynamics of the salamander Ambystoma tigrinum in emphermal desert ponds: A simulation model. $100.

ROBERT E. GATTEN, JR., College of Wooster, Wooster, Ohio. Thermoregulation in the crocodilian reptile, Caiman sclerops. $125.

WILLIAM H. KEEN, Kent State University. Foraging strategies and niche exploitation patterns of the Allegheny Mountain salamander, Desmognathus ochrophaeus. $125.

KIRK MILLER, Colorado State University. Clinal variation in critical thermal maximum of chorus frogs. $100.

GARY J. TORRISI, State University College, Plattsburgh, New York. The effect of urethan on calcium and phosphate excretion by Rana pipiens (leopard frog). $75.

MPM - AMAZON EXPEDITION

On 14 October a MPM sponsored research expedition left the U.S. for Iquitos, Peru in the upper Amazon River basin. The trip was funded through the James Kuehn Research Fund. Dr. Max A. Nickerson is the expedition leader. The research party includes Dr. James Dixon, Texas A & M University; Richard Spieler, Louisiana State University; Lynn Hendricks, Yakima Valley College; Phil Holzbauer, University of Wisconsin-Whitewater; MPM staffers, Robert Henderson, Janice Mahlberg, Floyd Easterman; the Sherman Ketcham's, Milwaukee County Zoo and James Kuehn, the sponsor. The group will make natural history collections, survey vertebrates for hemoparasites and fungi and utilize radio-telemetry tracking equipment to study activity patterns. Mr. Pekka Soini, a Peruvian naturalist will assist the group during their two month trip.

JAIME VILLA (Cornell University) has successfully completed 2 1/2 months of intensive field work in Nicaragua (Matagalpa) and Costa Rica (San Jose), studying the biological relationships between unhatched tadpoles of some centrolenid and hylid frogs and certain flies (Eryphidae, Drosophilidae). Two parasitic species were investigated in greater detail, and 3 others were found also associated with the frogs, but the nature of their relationship was not fully established. Additional field work is planned for the next rainy season.

The Zoological Society of San Diego is actively recruiting a Curator of Reptiles. The successful applicant should have at least a masters degree (Ph.D. preferred) with a broad knowledge of herpetology and some practical experience in maintaining a herpetological collection. Salary range is $13,836 to $16,800 plus fringe benefits. Send resume to: Clayton G. Swanson, Personnel Director, San Diego Zoological Garden, P.O. Box 551, San Diego, CA 92112.

John B. Funderburg, formerly Chairman, Biology Department, Randolph-Macon College, Ashland, Virginia, has been appointed Director of the North State Museum of Natural History, Raleigh. Dr. Funderburg is conducting research into the distribution and ecology of southeastern herpetozoa, especially hylid frogs. He has appointed John E. Cooper, formerly Associate Professor of Biology, Community College of Baltimore, to the post of Director of Research and Collections at the Museum, and Cooper is continuing his research on southeastern herpetology and on cave-associated vertebrates. Alvin Braswell, who has been curating the museum at the Highlands Biological Station, Highlands, North Carolina, has assumed the position of Curator I (Herpetology) at the State Museum. Braswell is investigating variation in Elaphe obsoleta in North Carolina and assisting William Palmer, Curator of Lower Vertebrates, in southeastern herpetological studies. Palmer is completing a book on the amphibians and reptiles of North Carolina, with illustrations by staff illustrator Reynaldo Kuhler.

CURRENT LITERATURE

As of July 1974, 59 searchers are scanning a total of 408 journals.
Searchers: As the titles will be published 4 times per year, try to send your titles in at least 4 times a year to have an approximately equal listing each issue in HR.

Due to lack of space in this issue, an updated list of journals is not included. Such an updated list is scheduled for next issue, budget permitting.

Any questions, comments, etc. should be sent to:

Ron Heyer
Current Literature
Amphibians and Reptiles
Smithsonian Institution
Washington, D.C. 20560

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Wanted: Good colored slides of all subspecies of Lampropeltis triangulum for possible inclusion in a monograph. Contact Dr. Max A. Nickerson, Vertebrate Division, Milwaukee Public Museum, Milwaukee, Wisconsin 53233.

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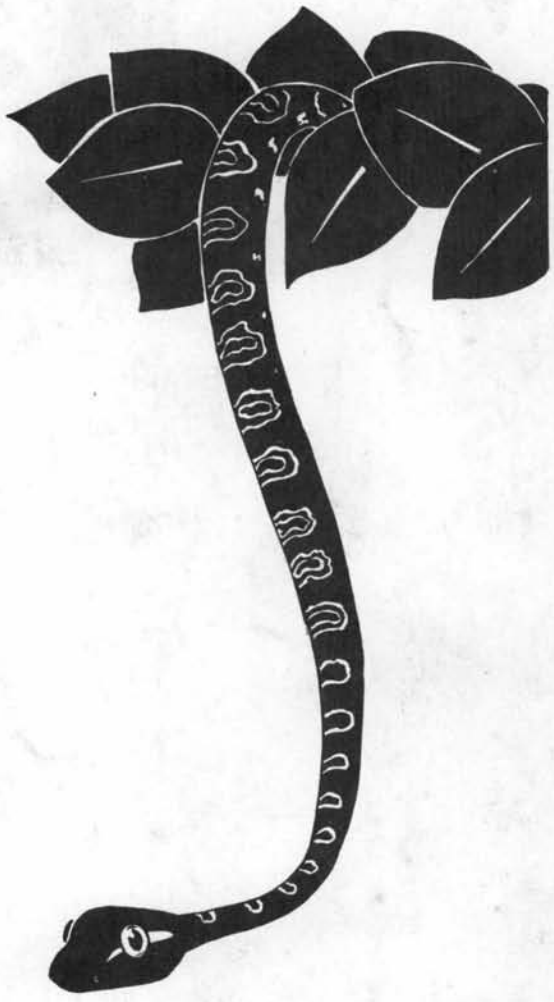
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BACK COVER

Anelytropsis papillosus from Mexico: San Luis Potasi, El Salto Falls. (Photo: Robert A. Thomas, Texas A&M University).



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CONTENTS

SQUEEZE BOX TECHNIQUE FOR MEASURING SNAKES by Hugh Quinn 35

THE INSTITUTO CLODOMIRO PICADO by Jaime Villa 37

NOTES ON A BROOD OF COLUBER CONSTRICTOR HELVIGULARIS AUFFENBERG
by R. E. Herrington 38

SOCIETY NEWS 39

NEW PUBLICATIONS 40

FROM THE NEWS SHEETS
RECENT DEATHS 41

AMERICAN ASSOCIATION OF ZOOS, PARKS & AQUARIUMS CENTRAL
REGIONAL CONFERENCE: EMPHASIS HERPETOLOGY
by Ray E. Ashton, Jr. 42

NEWS NOTES FROM SWANEWS, 1974
INDIVIDUALS & INSTITUTIONS
NEW ADDRESSES 43

PENNSYLVANIA PROTECTS THE BOG TURTLE
BOUNTY ON RATTLESNAKES IN NEW YORK
EFFORTS TO SAVE THE BOG TURTLE. 44

CONSERVATION NOTES. 45

THE KENTUCKY HERPETOLOGICAL SOCIETY 46

MIDDLE AMERICAN RESEARCH
GEOGRAPHIC DISTRIBUTION 47

CURRENT LITERATURE 50

HERPETOLOGICAL TECHNIQUES 62

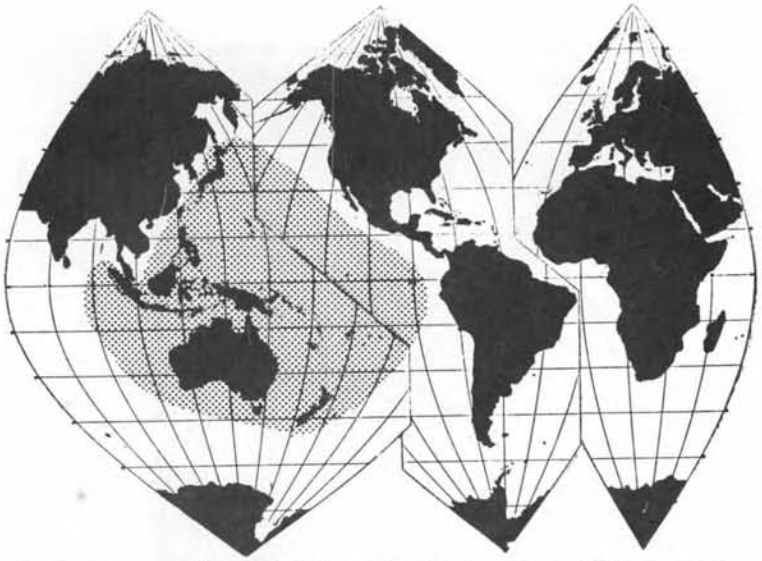
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::Loveridge
REPTILES (and Amphibians) OF THE PACIFIC

271 pages, 7 plates, 1 double-page map, index (originally published in 1946 by Macmillan Company, New York)

THIS BOOK treats the herpetofauna of a vast region including Indonesia, the Philippines and Japan, Australia, New Guinea and New Zealand, and an enormous array of islands including Hawaii and the Galápagos. With such isolated land masses, the fauna is predictably diverse and includes the tuatara, several crocodiles, various lizards including the Komodo dragon, flying lizards and the Galápagos iguanas, numerous pythons, the king cobra and other poisonous elapids and vipers, the wide-ranging marine turtles and sea snakes, caecilians, the giant salamander, and many frogs and toads.

Authoritative yet written in a clear and untechnical manner, this book is the standard reference on the Pacific herpetofauna and is equally useful to professionals and amateurs. Each species is described and its range noted, together with a discussion of its life history and remarks on capture, captive specimens, reproductive habits, and use as food. There are identification keys to families and species, illustrated with seven diagnostic plates. Finally, there are chapters on snake bite and its treatment, economic aspects and conservation, collecting techniques, procedures for shipping living and preserved specimens, and an annotated bibliography.

Mr. Loveridge, now retired, was formerly curator of herpetology at Harvard University, and is a noted authority on the amphibians and reptiles of Africa and the South Pacific.

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SQUEEZE BOX TECHNIQUE FOR MEASURING SNAKES

Several techniques for measuring the length of live snakes have been described (Fitch, 1960; Campbell, 1973), but we feel that these techniques are either inaccurate, stressful to the snakes, or dangerous when measuring venomous snakes. The squeeze box technique for measuring snakes was developed from an effort to solve these problems. A rectangular box was constructed from 1/2 inch (1.27 cm) plywood 20x50x20 cm with an open top. The inside bottom of the box was covered with an inch (2.54 cm) foamed rubber pad (Fig. 1).

To measure a snake by the squeeze box technique, it is placed into the box and gently but firmly pressed against the foamed rubber pad with a piece of 1/8 inch (.3175 cm) thick plexiglass having the same length and width as the inside of the box. A line is then drawn on the plexiglass, with a hydromarker, from the tip of the snake's snout down its vertebral line to the tip of its tail. A dacron string is placed along the line on the plexiglass, marked for length, and laid along a ruler to determine the length of the snake.

A hydromarker is used because the line drawn by this marker is easily washed from the plexiglass with water. Dacron string is used because it does not stretch appreciably. A map measurer was not used to measure the length of the line drawn on the plexiglass because none could be found that was graduated in millimeters.

To determine the statistical reliability of the squeeze box technique for measuring snakes, a juvenile Cyclagras gigas was measured fifty times in succession. The length measurements varied from 340 to 348 mm with a mean of 344.9 (± 1.66SD; ± 0.24SE). The confidence limits for 95% of the means of similar samples were between 344.40 and 345.36 mm.

Acknowledgements

We are grateful to Donna Campbell for the illustration and to Dr. William F. Pyburn and Jonathan A. Campbell for commenting on the original manuscript. Appreciation is also extended to the Fort Worth Zoological Park for an opportunity to develop this snake measuring technique.

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Products Mentioned in Text

Hydromarker is manufactured by Russ Berrie Co., P.O. Box 24, Pallisades Park, New Jersey.

Hugh Quinn, Department of Education; J. P. Jones, Department of Herpetology, Fort Worth Zoological Park, Fort Worth, Texas 76110.

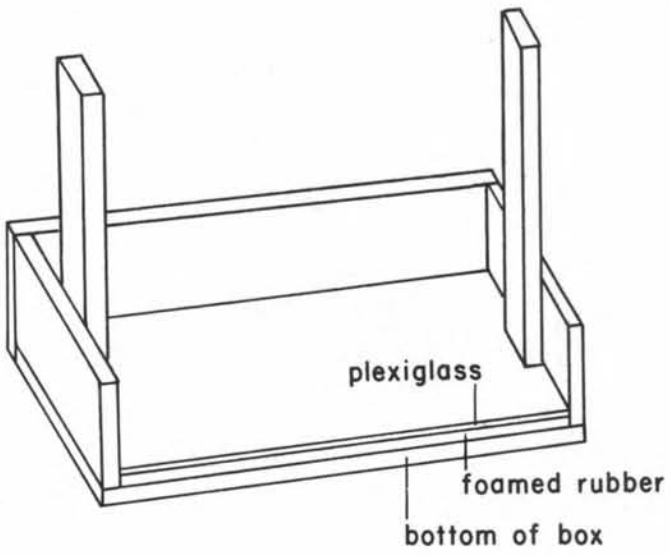


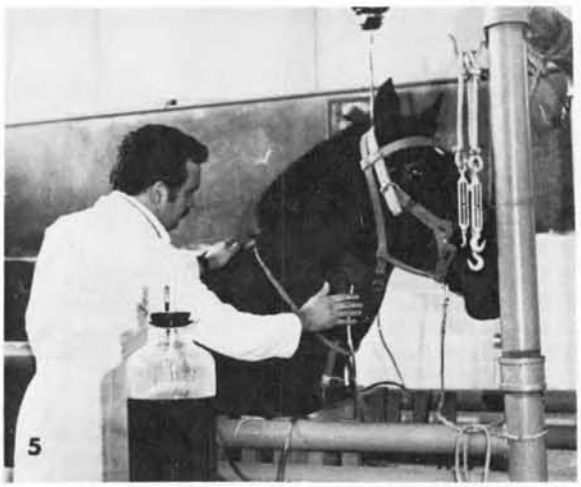
FIG. 1. Cut-away view of squeeze box.











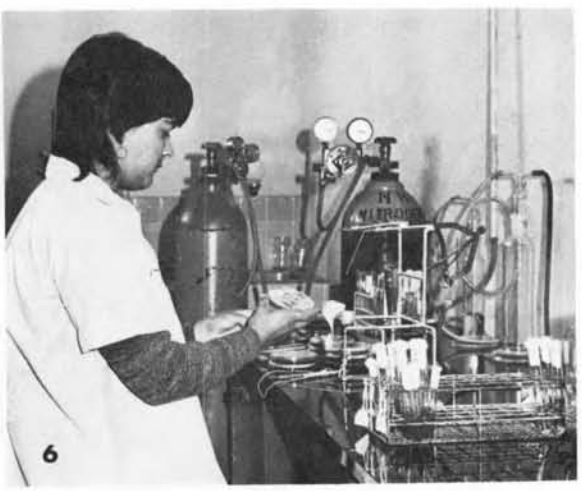


Fig. 1. A six-foot terciopelo, Bothrops asper, being milked by assistants Gerardo Sanchez (right) and Alvaro Flores (left). Fig. 2. Blood is obtained from a "mussurana" for the immunological studies of Dr. Luis Cerdas (left). Assistant Alvaro Flores (right) holds the head. Fig. 3. Blood parasites of local herps are the subject of Edgardo Moreno's research. Fig. 4. Dr. Roger Bolanos, director of the Instituto Clodomiro Picado. Fig. 5. Lic. Richard Taylor obtaining blood from a horse. The red blood cells separated from the plasma of a previous blood extraction, are about to be returned to the donor. Fig. 6. Srita. Olga Arroyo isolates bacteria from snake venom.

THE INSTITUTO CLODOMIRO PICADO

Jaime Villa

Perhaps because of its political stability and emphasis on education, Costa Rica has distinguished itself as the Central American Republic where most of the active biological research takes place, and it is usually performed by native investigators. Just how much of this has been due to the influence of the late Dr. Clodomiro Picado, the Costa Rican naturalist, is hard to say, although not in the institute which bears his name. Last summer, those attending the ASIH-Costa Rica meetings, had the opportunity to enjoy the meetings in a benign (but genuine) tropical atmosphere, and also visit the Instituto Clodomiro Picado in the village of Coronado, near the San Jose. We inspected its facilities and chatted with its staff and students. Many of the contributors to the symposium on "Fish, Amphibian and Reptile Poisons" had done their research at the Instituto.

The Instituto Clodomiro Picado is part of the Universidad de Costa Rica , and is directed by Dr. Roger Bolanos (Ph.D., Tulane), who is also professor of immunology at the University. Most of his staff and students are joint appointees, and the institute is a likely place to do thesis research and other laboratory studies dealing with herps and their venoms.

The institute's physical facilities comprise three buildings with a serpentarium, research, production and quality-control labs and stables. As with the Instituto Butantan of Brazil, a great deal of emphasis is placed on the production of snake antivenin. The antisera thus far manufactured include a polyvalent for Central and South American forms of Bothrops, Crotalus and Lachesis, produced for both human and veterinary purposes (the latter a larger, 40 ml dose). In addition, elapid antisera are available. The bite of the large, black-and-red Micrurus mipartitus can now be neutralized by a specific antiserum produced by the institute. Also available now is a generalized coral snake antiserum, effective against most other Central American Micrurus. The production of sea snake (Pelamis) antiserum is presently being studied.

Active research is done by teamwork led by a principal investigator, often a graduate or undergraduate student at the University. The institute's director, Dr. Bolanos, is working on immunological and immunochemical aspects of coral and sea snake venom. Lic. Richard Taylor (no relation!), is studying the cytosystematic aspects of Costa Rican Micrurus and Bothrops, especially B. asper and B. atrox.

Dr. Luis Cerdas is studying the natural immunity of the mussurana, Clelia clelia, to elapid and crotalid venoms. Edgardo Moreno is investigating the blood parasites of local snakes and Srita. Olga Arroyo is doing research on aerobic and anaerobic bacteria found in snake venoms. It is Dr. Bolanos' intention that the institute would provide research facilities for visiting scientists.

An important facet of the institute's work is the educational assistance provided to Costa Rican schools and other visitors; talks on snakes and snakebite are regularly scheduled, and a variety of displays and exhibits (such as snake skins and live snakes) are open to the public.

Although herpetologists are familiar with the name of Clodomiro Picado mostly through his many books and papers on Costa Rican poisonous snakes and by patronyms such as Bothrops picadoi (among many others), his works on hematology, immunology and parasitology, not to mention his classic study on the bromeliads as an entirely new habitat, then unknown and unexpected, are only part of the legacy of his naturalist genius. The Instituto Clodomiro Picado is a fitting tribute to his memory, and one he would certainly be proud of.

Section of Neurobiology and Behavior
Cornell University
Langmuir Laboratory
Ithaca, NY 14850

NOTES ON A BROOD OF COLUBER CONSTRICTOR HELVIGULARIS AUFFENBERG

Since the 1955 description of Coluber constrictor helvigularis by Walter Auffenberg, no formal description of the young of this subspecies has appeared. It is the purpose of this paper to describe the young of this subspecies of racer.

On 21 May 1973 while on a field trip in the Apalachicola drainage system in the Florida panhandle, an adult female Coluber c. helvigularis was caught crossing a paved road five miles south of the city of Bristol, Liberty Co., Florida. The specimen measured 1280mm in total length (part of tail missing).

The specimen deposited fifteen non-adherent eggs on 25 May 1973. The eggs are typical Coluber eggs in having the noticeably grainy texture, as stated by Conant (1942). The egg laying process took approximately 1.5 hours.

The eggs were incubated in a manner similar to that used by Zweifel (1961). They were kept at room temperature (24-27°C) in a small clear plastic box that was lined with moist paper toweling. The box was exposed to fluorescent light sixteen hours per day to retard mold growth. On 29 July, after an incubation period of 65 days, the eggs began to hatch. Two eggs hatched 29 July, six hatched 30 July, and six hatched 31 July; the remaining egg was opened and found to contain a normal embryo. Each egg was slit at least twice during the hatching process. The juvenile snakes remained in the egg cases from 4 to 30 hours after having made the first slit. All measurements were taken within 24 hours of hatching. The fifteen specimens are now in the collection of the University of Michigan Museum of Zoology number 132888.

The ground color of the young brown-chinned racers is light gray anteriorly, gradually fading to grayish-brown on the posterior one-third of the body and tail. The dorsal blotches are maroon with dark brown borders, these gradually fade and diminish in size becoming partially obscured on the posterior one-third of the body. The ventral coloration is white on the chin and throat, gradually darkening to light gray near the anus. The underside of the tail is pinkish-gray and is noticeably lighter in coloration than the posterior one-third of the body. The lateral spots are dark brown in color and are randomly scattered between the dorsal blotches. The ventral spots are maroon and number from 2-6 per scute; these gradually fade and are absent on the posterior one-third of the body. The eye color of newly hatched helvigularis is reddish-brown. One feature that is constant in the specimens at hand is the almost complete delineation of the second lower labial scale with small brown pigment spots.

Specimens ranged from 260-340 mm in total length with snout-vent length from 187-241 mm. Tail length as a percentage of total length ranged from 23.5-29.5% with the mean for five males being 27.1% and for nine females 27.2%. All specimens have 17-17-15 scale rows. All specimens have 7+7 upper labials and thirteen have 8+8 lower labials;one male has 9+8 lower labials and one female has 8+9 lower labials. The ventrals ranged from 168-178 (mean 173.8) in six males and 173-180 (mean 177.6) in nine females. The caudals ranged from 112-144 (mean 112.6) in five males and 104-115 (mean 108.7) in nine females. Twelve specimens have 2+2 postoculars, two have 2+3 and one has 3+3 postoculars.

I am grateful to Dr. Sherman A. Minton, Jr. for technical assistance given in the preparation of this paper.

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Zweifel, R. G. 1961. Another method of incubating reptile eggs. Copeia, 1961 (1):112-113.

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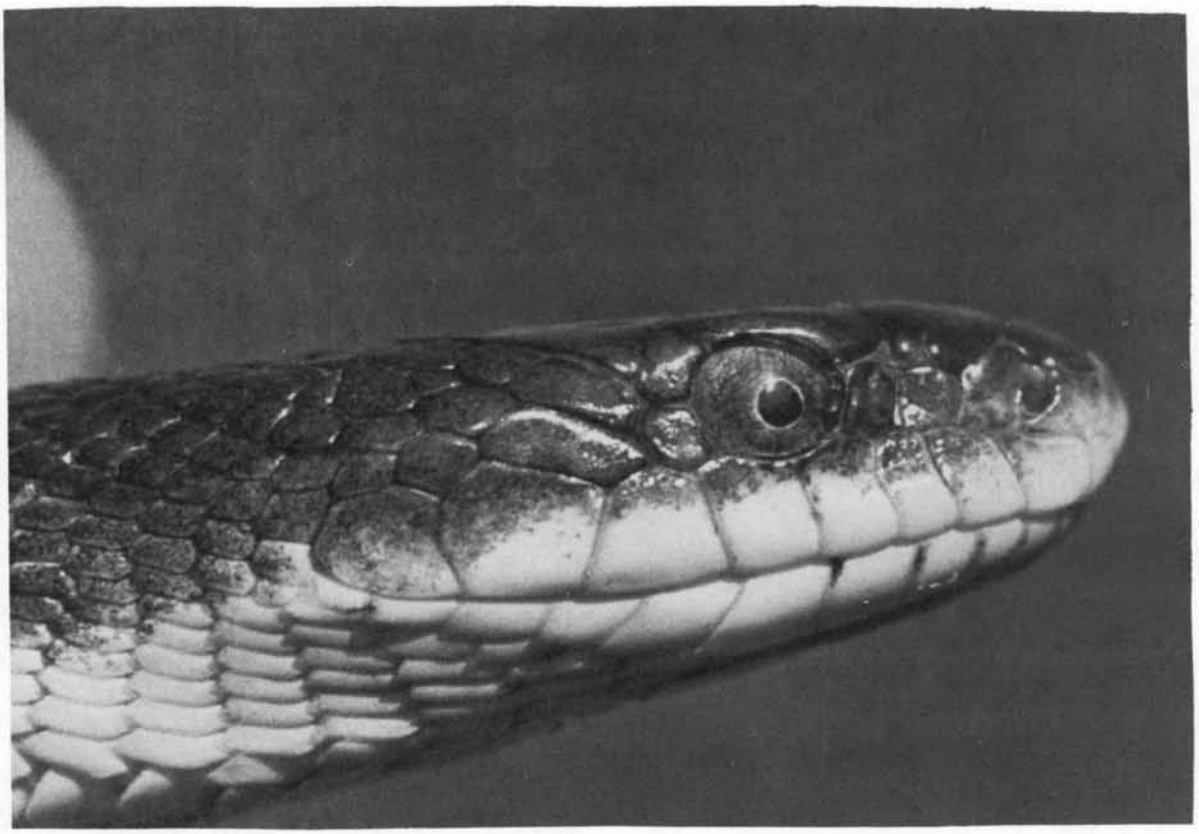
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SOCIETY NEWS

St. Louis Herpetological Society

St. Louis, Missouri amateur and professional herpetologists have organized a new regional society. The SLHS is interested in promoting public education and conservation of the Missouri herpetofauna. Meetings will be held monthly at the St. Louis Zoo. A newsletter will also be distributed on a monthly basis. Dues are $5.00 per year. For more information, or to join, write to: Bob Bader, St. Louis Herpetological Society, 9561 Madelaine Manor, Berkeley, Missouri 63134.

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Prairie King Snake, Lampropeltis c. calligaster, from Jackson Co., Illinois. (Photo by Stanley Dyrkacz)

NEW PUBLICATIONS

* * * * * * * * * *

Careers in Biological Systematics

The Society of Systematic Zoology has just published a sixteen-page, illustrated brochure for persons who are considering a career in animal or plant systematics. The field of systematics is described, together with examples of current research; other sections of the booklet deal with employment, training and recommended readings. Single copies are available free of charge by writing SSZ, c/o Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

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Biological Abstracts will introduce a Genus-Species Index in 1974. The Biosystematic Index which they have published for eleven years will be continued in its present format.

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Amphibians & Reptiles in Kansas, by Joseph T. Collins, will be available July, 1974. Its publication is co-sponsored by the Univ. of Kansas Museum of Natural History and the Kansas Biological Survey. The contents include individual accounts of the 91 kinds of amphibians and reptiles of Kansas and over 100 B & W photographs.

* * * * * * * * * * * * * * * * * *

Amphibians: Guidelines for the breeding, care and management of laboratory animals. National Research Council. National Academy of Sciences - National Academy of Engineering , Printing & Publishing Office. ix + 153 pp., 1974.

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BOOK REVIEW

John Goode, "Turtles, Tortoises, and Terrapins". (Illus. Alex Bailey). NY: Scribner's, 1971. 63 pp.

"Turtles, Tortoises, and Terrapins" is an elementary introduction into the natural history of turtles. John Goode's journalistic background shows in the clearly written and easily readable text. Similarly his facts are accurate and not distorted by simplistic generalities. Since the book is directed towards an Australian elementary and junior high school audience, many of his examples are drawn from the small Australian turtle fauna; because of this it has somewhat limited use to a general American audience of that level. However, an avid turtle collector will enjoy and learn from this book.

Its content is divided into nine chapters. The first three chapters describe the major groups of turtles, the structure of the shell, special protective and food getting adaptations, and turtle reproduction. The next two chapters deal with sideneck turtles followed by one chapter each on tortoises and sea turtles. Book concludes with two chapters dealing with turtles' interaction with man. A glossary and index are present.

George Zug
National Museum of Natural History

Kansas Herpetological Society

A new herpetological society was recently organized in Lawrence, Kansas. Anyone interested in becoming a member is requested to apply to: Ms. Mary Dawson, KHS Treasurer, Topeka Zoological Park, 635 Gage Boulevard, Topeka, Kansas 66606. Dues are $3.00 and checks can be made payable to "Kansas Herpetological Society".

FROM THE NEWS SHEETS

Albino Toad Found in Michigan

A four-year old boy in Warren, Michigan found an albino toad which is causing excitement among researchers at the University of Michigan Amphibian Facility. The transparent skin of the albino will allow scientists to observe the animal's bodily functions. (Milwaukee Journal, 10 June 1974).

SEA SNAKES KILL SWIMMERS

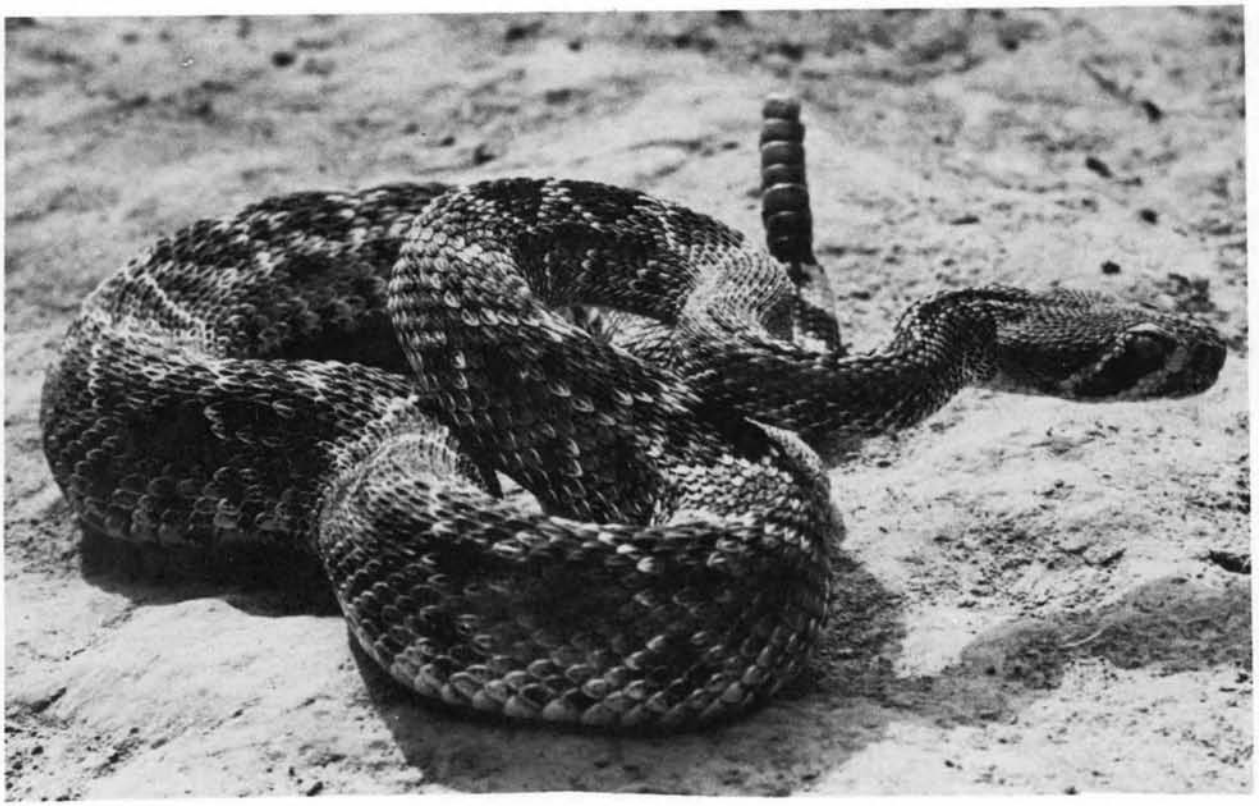
Dozens of swimmers and fishermen have been killed by sea snakes recently off the tourist beach at Vung Tan, 70 miles northeast of Saigon on the China Sea. Sources say the snakes, usually found 90-180 miles northeast of Saigon, have been moving south looking for food in recent years. (Agence France- Presse dispatch in The Milwaukee Journal)

RECENT DEATHS

Glenn Gentry, 78; retired chief of fish management, Tennessee Game & Fish Commission, died 15 December. He was the author of publications concerning Tennessee's herpetofauna and an active member of SSAR Conservation Committee until 1973.

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A. E. McDaniel, 43; Curator of Reptiles, Max Allen's Zoological Gardens, Eldon, Missouri, died 5 May in a truck-bicycle accident. He was the author of two herpetological notes and often assisted scientists obtain specimens or data. Mr. McDaniel had survived the bite of a black mamba (Dendroaspis polylepis) in 1965.



Western Diamondback Rattlesnake, Crotalus atrox, from Brewster Co., Texas. (Photo by Stanley Dyrkacz)

AMERICAN ASSOCIATION OF ZOOS, PARKS AND AQUARIUMS CENTRAL REGIONAL CONFERENCE: EMPHASIS HERPETOLOGY

The AAZPA Central Regional Conference was held in Arlington, Texas on April 7-11. The meeting began by introducing the special guest and recipient of the AAZPA Presidents Award to Dr. Edward H. Taylor, Professor Emeritus, Kansas University. The award was given to Dr. Taylor in view of his long list of accomplishments in the field of herpetology and identified him as one of the early "fathers of modern herpetology". A major part of the program centered around herpetology in zoos and on the natural history of various species in the wild. Topping off the program was a superb paper on the feeding behavior in Varanus komodensis by Dr. Walter Auffenberg, Florida State Museum.

Two other events of the meeting were important to the field of herpetology. First, Dr. Earl Baysinger, Office of Endangered Species, Washington, talked about and answered questions concerning the recent laws and pending legislation that will affect the importation and transportation of animal species across state lines and possession of various animals. The Lacey Act, Endangered Species Act of 1973,and an International Treaty were among the topics of great concern. After attending this meeting and doing some investigations into the situation, I feel that the SSAR should invite Dr. Baysinger to the Auburn meeting to talk with us how these laws will affect the work of herpetologists in the U.S. and abroad.

The final area of concern to SSAR members was covered in speeches given by Wayne Seibert, Dallas Museum and me, on the cooperation between zoos, museums and other professional herpetologists. The present lack of funding for research both in museums and universities will be coupled with increased restrictions on importing animals. The time seems right for increased cooperation to fully utilize any animal taken from the wild for research and public education purposes.

Ray E. Ashton, Jr.
Coordinator of Public Education
Museum of Natural History
University of Kansas
Lawrence, Kansas 66045

REPTILE-AMPHIBIAN LONGEVITY SURVEY

J. Kevin Bowler, Curator of Reptiles at the Philadelphia Zoological Garden, is continuing and expanding the work on reptile and amphibian longevity begun by the late Charles E. Shaw and by Carl Kauffeld. Mr. Bowler requests that supervisors of institutional and private collections write to him for survey record sheets. All responding collections will receive a summary of the survey and appropriate credits in any publication of the data. Write to Mr. Bowler at the Philadelphia Zoological Garden, 34th Street and Girard Ave., Philadelphia, Pa. 19104.

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NEWS NOTES FROM SWANEWS, 1974 (1 & 2)

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Kenneth Williams (Northwestern State University, Nachitoches, Louisiana) has initiated work on the snake genus Apostolepis and is continuing work on a semi-popular book, "Living Snakes of the World" for T. F. H. Publications.

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Victor Hutchison, Howard Haines, Gus Engbretson, and Don Howard of the University of Oklahoma are studying the physiological ecology of telmatobatid frogs on Lake Titicaca in the high Andes of Peru.

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Larry G. Michel and Michael E. Newlin (Angelo State University) are studying aspects of the ecology of Urosaurus ornatus and Sceloporus scalaris, respectively, and Marsha White is studying the herpetofauna of Mason County, Texas.

* * * * * * * * * * * * * * * *

John W. Ferner (Univ. of Colorado) is studying a population of Uma exsul in northern Mexico.

INDIVIDUALS & INSTITUTIONS

UNIVERSITY OF KANSAS: William E. Duellman, Linda Trueb, and John E. Simmons will be traveling through western South America from May 1974 to August 1975. Research projects on the evolution of egg-brooding frogs and ecology and biogeography of the Andean herpetofauna are supported by grants from the National Science Foundation and National Geographic Society, respectively. During their absence from the Museum of Natural History, the herpetological collections will be supervised by Alan H. Savitzky and Joseph T. Collins.

Martha L. Crump completed her Ph.D. dissertation "Reproductive strategies in a tropical anuran community". Beginning in August 1974 she will have a post-doctoral research position at the Department of Biology, Brooklyn College, CUNY.

Stephen R. Edwards completed his Ph.D. dissertation "A phenetic analysis of the genus Colostethus (Anura:Dendrobatidae)". He will continue as Administrative Officer of the Association of Systematic Collections at the University of Kansas.

Effective 1 July 1974 Richard Wassersug will be an Assistant Professor, Department of Anatomy, University of Chicago.

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NEW ADDRESSES

Effective 1 July 1974

William S. Brown
Department of Biology
Skidmore College
Saratoga Springs, NY 12866

William S. Parker
Department of Zoology
University of Texas at Austin
Austin, TX 78712

Effective 1 August 1974

Edmund D. Brodie, Jr.
Biology Dept.
Adelphi University
Garden City
Long Island, NY 11530

Richard R. Montanucci
Zoology Dept.
Clemson University
Clemson, SC 29631

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PENNSYLVANIA PROTECTS THE BOG TURTLE. With the passage of House Bill 1248, by the General Assembly, Pennsylvania has joined other states in providing legal protection for the Bog Turtle (Clemmys muhlenbergi). The new law, which amends Section 300 of the Fish Law of 1959 relating to frogs, tadpoles and turtles, provides a stiff penalty. The amendment makes it unlawful "to catch, take, kill, have in possession, sell, or offer for sale or purchase, without permit from the Director of the Pennsylvania Fish Commission, any bog turtle (Clemmys muhlenbergi)." Each turtle constitutes a separate offense, and the law provides that any Bog Turtle caught by mistake is to be released immediately in the condition in which it was taken. The amended law specifies a fine of $500, upon conviction.

The Pennsylvania Bog Turtle law is designed to stop further drains on depleted populations in Pennsylvania and in other states. The prohibition of sale of Bog Turtles is aimed directly at unscrupulous dealers who have helped to maintain the demand for Bog Turtles as pets. The fine of $500 was set high enough to offset any possible profit from sales of Bog Turtles.

Passage of the law has resulted in newspaper publicity for the plight of the Bog Turtle, and public interest in its preservation. Following the lead of the Pennsylvania Fish Commission, which initiated and supported the Bog Turtle law, conservation agencies in Pennsylvania are making plans to protect some of the remaining populations and habitats. C. J. McCoy, Carnegie Museum of Natural History, Pittsburgh, PA 15213.

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BOUNTY ON RATTLESNAKES IN NEW YORK

It has come to our attention that a bounty on the Timber Rattlesnake (Crotalus h. horridus) is about to be reinstated in upper Warren and Washington Counties (Lake George region). The bill has already passed the State Assembly 100-15 and is now on the State Senate Floor. It should be pointed out that the bounty, $5.00 per head, is pushed by the area's hotel and resort owners. The State Conservation Department is not in favor of the bill for the simple reason that a bounty is not a solution to any type of Wildlife management. Most of the snakes taken in previous years (1969-1971) were taken from unpopulated areas by professional hunters.

If you live in New York, we urge you to write at once to your local State Senator, with a copy to Senator Bernard Smith, Chairman, Committee on Conservation & Recreation, Senate Chambers, Albany, New York 12224.

If you are out of State write to Senator Smith in reference to Assembly Bill A-8711. (From N.Y. Herp. Soc. Newsletter)

EFFORTS TO SAVE THE BOG TURTLE

John L. Behler, Dept. of Herpetology, Bronx Zoological Park, "has received authorization from the New York State Dept. of Environmental Conservation to conduct a statewide survey and inventory on the Bog Turtle (Clemmys muhlenbergi)." (From N.Y. Herp. Soc. Newsletter).

CONSERVATION NOTES

* *

"Recent studies by Dan W. Speake and Robert H. Mount indicate that the use of gasoline fumes or gasoline itself to drive herps out of gopher tortoise burrows is ecologically unwise and may kill or injure snakes and other inhabitants of the gopher-burrow "niche". Four of six rattlesnakes in burrows so treated were killed or inactivated and four of five indigo and pine snakes, driven from burrows, died within 24 days.

The Conservation Committee strongly recommends that this method of snake capture be discontinued by all SSAR members. Further studies on the effect of the technique on invertebrate and other inhabitants of the burrows appear desirable."

(Reference: Speake & Mount, 1973. Quart. Prog. Rept. Alabama Coop. Wildl. Res. Unit, 38(4):19-20.)

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According to the Office of the Governor of the Commonwealth of Puerto Rico "recent studies have determined not to build the proposed superport neither in Mona nor in Monito Island." (From a letter to Kraig Adler from Luis Montalvo Cardona, Special Aide to the Governor of Puerto Rico).

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Turtles May Save Culebra

Because of the Endangered Species status of nesting marine turtles on Culebra Island off the east coast of Puerto Rico, the U.S. Navy may have to abandon use of Culebra for target practice. Legal counsel for Puerto Rico said there were no federal laws to protect the people of Puerto Rico from Navy shelling, but that there is a law to protect the endangered species. (From a Washington Post Service dispatch in The Milwaukee Journal, 24 May 1974).



Iguana, Iguana iguana rhinolopha, from Belize, Cayo District, Benque Viejo. (Photo by Robert W. Henderson)

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THE KENTUCKY HERPETOLOGICAL SOCIETY

COMING 1974 MEETINGS

Meeting Place: Education Room, Louisville Zoological Gardens

Meeting Time: 5:30 p.m.

July 21: Program by
Dr. Sherman A. Minton, Jr.
Indiana University School of Medicine
Indianapolis, Indiana

August 18: Joseph T. (Tom) Collins
University of Kansas
Museum of Natural History

September 15: Program by
Dr. Burt Monroe
Department of Biology
University of Louisville

* *

PLEASE, SOMEONE, PUT A HEX ON MY VEX

A toad, is a toad, is a toad
I think when meeting one on the road,
But my friend the herpetologist
Can't resist playing the humorist.

Bufonidae!, he shouts in glee
While we more sober fellows flee.
Bufo a. americanus, --- warty
He stands there petting it, the smarty!

People I know, on every level
Flee like the wind, cuss like the devil,
Our meeting the kindliest of snakes
Provokes the shakiest of shakes.

Yet armed with just his crooked cudgel
He mucks about in every puddle,
No stone unturned from Minn. to Floridus
Poking around for Crotalus horridus.

I pray that this quaking of my knees
In my afterlife somehow will cease,
And strength be granted me, I sigh,
Just once, to look one in the eye!

Leo Johnson - MPM



MIDDLE AMERICAN RESEARCH

William J. Mautz, a doctoral student of Cornell University's F. Harvey Pough, will be spending his second field season (July-August 1974) in the Mexican States of Queretaro and Guerrero. Mautz is studying habitat selection and evaporative water loss in the xantusiids Lepidophyma gaigei and L. flavimaculatum.

CHECKLIST OF THE HERPETOFAUNA OF BELIZE

Robert W. Henderson, Milwaukee Public Museum and Leo G. Hoevers, Belize are compiling a checklist of the amphibians and reptiles of Belize (formerly British Honduras). They would appreciate being notified of any research being conducted in Belize, or with Belize material. Also, any institutions or individuals having specimens from Belize, and not already contacted, please notify R. W. Henderson, Vertebrate Division, Milwaukee Public Museum, Milwaukee, Wisconsin 53233.

CARIBBEAN FIELD STUDY TOUR

The University of California-Los Angeles Extension has arranged a two-week summer field study trip July 18 - August 1, with 3 units credit, designed to introduce biology students and serious amateur naturalists to the exciting spectacle of island evolution. The group will visit the oceanic islands of Puerto Rico and St. Vincent and the "continental" island of Trinidad. The tour will be under the guidance of Drs. George C. Gorman and Catherine Engel. Interested persons should write to: Dept. of Biological and Physical Sciences, University Extension, 6115 Math-Science Building, Univ. of California, Los Angeles, CA 90024.

GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW publishes brief notices of new geographical records in order to make them available to workers in published form. The STANDARD FORMAT for a record is:

SCIENTIFIC NAME (Common name). Locality (air-line distance to nearest town); date; collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY. address.

Please submit new records in STANDARD FORMAT (short manuscripts are acceptable when data cannot be adequately presented in standard format) to George R. Zug, Division of Amphibians and Reptiles, National Museum of Natural History, Washington, DC 20560.

Recommended citation: Jones, J. 1974. Geographic Distribution: Rana pipiens. Herpt. Rev. 5(1):1.

SERPENTES

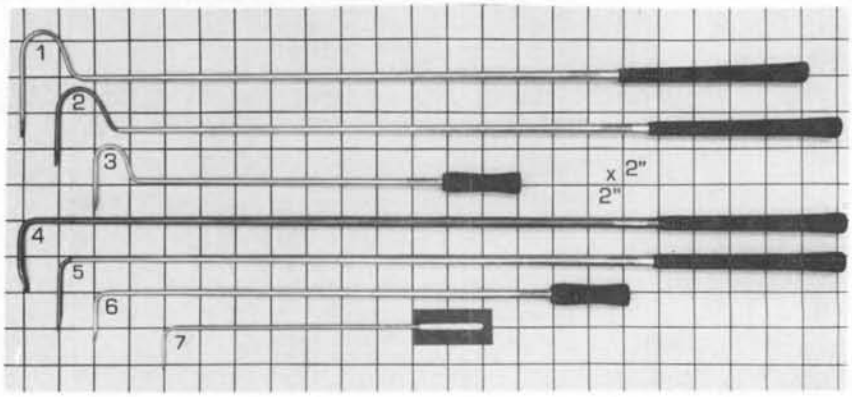
PITUOPHIS MELANOLEUCUS SAYI (Bull Snake). U.S.A., Missouri, St. Clair Co., 2.0 km NE of Lowry City, (R25W, T39N, Section 8); 5 May 1974, Robert Krager. Robert Krager and M. A. Nickerson. Milwaukee Public Museum Herpetological Collection, MPM 7470. First record for the county and a marginal Ozark record. Submitted by Max A. Nickerson.

TROPIDOCLONION LINEATUM LINEATUM (Northern lined snake). U.S.A., Missouri, Miller Co., 4.5 km S of Eldon, (T41N, R15W, Section 22); 20 June 1973, A. E. McDaniel. M. A. Nickerson. Lost by Ozark Airlines. First record S of the Missouri River in central Missouri. Submitted by Max A.Nickerson, Milwaukee Public Museum, Milwaukee, Wisconsin 53233.

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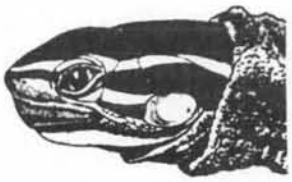
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Testudines, By Malcolm A. Smith (1931) (Reprinted 1973)
P.p. i-xxvii, 1-185, 2 plates, map, 42 text figs.
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No. 1 The State Laws Regulating the Collecting of Reptiles and Amphibians in the Fifty United States, Adrian F. Czajka and Max A. Nickerson, vii + 79 pp., 1974..... $ 1.75

PUBLICATIONS IN BIOLOGY AND GEOLOGY

No. 1 The Hellbenders: North American Giant Salamanders, Max A. Nickerson and Charles E. Mays, viii + 106 pp., 26 fig., one color plate, 10 tables, 1973..... $ 4.25

CONTRIBUTIONS IN BIOLOGY AND GEOLOGY

No. 1 Resource Partitioning Among the Snakes of the University of Kansas Natural History Reservation: A Preliminary Analysis, Robert W. Henderson, 11 pp., 1974..... $ .35

No. 2 Additions to the Herpetofauna of Belize (British Honduras), Leo G. Hoevers and Robert W. Henderson, 6 pp., 1974..... $ .35

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The first edition of this book was published in Uganda in 1938 and consisted of only 450 copies. It has long been rare, and in recent years the few copies that have turned up have been selling for about £60.

The author has now completely revised the text and 5 new coloured plates have been added, so that the new edition of this standard work is completely up to date. As the only comprehensive work on the snakes of any part of Africa north of the Zambezi it has an importance far beyond the confines of Uganda.

A prospectus with a specimen coloured plate will be available shortly, and the book is scheduled for publication in August 1974.

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This is the first listing of the current literature project. As the first goal of the project was to prepare any sort of listing for the number 2 issue of HR, the project is on schedule. Its ultimate success will be determined by the response of the individual scanners.

As of the end of May 1974, 63 persons have volunteered to scan 370 journals. The New World journals appear to be well represented; except for certain geographic areas, the Old World journal representation is weak.

The following represents the simplest possible listing; for example, multiple authored articles are listed only under the first author. The listing represents articles published on or after 1 January 1974. Some scanners sent 1973 titles, but these were not included. Information on each entry is presented as received from the scanners.

Comments on format changes that would improve the usability of the listing without significantly increasing the work load would be appreciated. Any comments, including volunteering to scan journals not now covered, should be sent to: Ron Heyer, Coordinator, Current Literature Project, Amphibians and Reptiles, Natural History Museum, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

A

AIMAR, CHRISTIAN, FRANCOISE GUILLET and FRANCOIS-XAVIER DESVAUX
1974. Syntheses proteiques chez l'hybride nucleocytoplasmique lethal obtenu par greffe nucleaire entre les especes Pleurodeles waltlii et Ambystoma mexicanum (Amphibiens, Urodeles).
C R ACAD SCI (PARIS), D, 278(5):663-666, 1 tab.

ALLEY, LIGE
1974. Frogs and pheasants.
COLO OUTDOORS 23(1):43.

ALLON, NAHUM and ELAZAR KOCHVA
1974. The quantities of venom injected into prey of different size by Bipera palaestinae in a single bite.
J EXP ZOOL 188(1):71-76.

ALNAES, E. and R. RAHAMINOFF
1974. Dual action of praseodymium (Pr^{3+}) on transmitter release at the frog neuromuscular synapse (Rana pipiens).
NATURE (LONDON) 247(5441):478-479.

ALPERIN, RICHARD J.
1974. Submicroscopic DNA distributional changes during iris metaplasia.
AMER ZOOL 13:1352 (abstr).

ANDERSON, JAMES D. and GERALD K. WILLIAMSON
1974. Nocturnal stratification in larvae of the mole salamander, Ambystoma talpoideum.
HERPETOLOGICA 30 (1):28-29.

ANDERSON, JAMES D. and VERONICA CURCIONE
1974. A basic bibliography of the bog turtle (Clemmys muhlenbergi).
HERP 10(1&2):33-36.

ANONYMOUS
1974. Habits of Boiga dendropyila in captivity.
HERP 10(1&2):38-39.

ANONYMOUS
1974. Rare bog turtles breeding at the Bronx Zoo.
HERP 10(1&2):39-40.

ANONYMOUS
1974. New county record for Caroline County, Va. (Rana virgatipes).
BULL VA HERPETOL SOC 73:4.

ARRONET, N. I. and E. I. DENKE
1974. Effect of hydrostatic pressure in protecting plant and animal cells and cell models from damage by heat.
DOK BIOL SCI 211(2):461-464.

ATHERTON, ROBERT W. and I-NA LEE
1974. Activities and isozymes of acetyl- and butyrylcholinesterase in developing Xenopus laevis.
AMER ZOOL 13:1319-1320 (abstr).

B

BADEN, HOWARD, SYLVESTER SVIOKLA and IRWIN ROTH
1974. The structural protein of reptilian scales.
J EXP ZOOL 188(2):287-294.

BADET, MARIE-THERESE, PIERETTE CHATEAUREYNAUT-DUPRAT and GUY ANDRE VOISIN
1974. Etude des reactions immunitaires chez l'amphibien urodele Salamandra salamandra L. Modalites de la reaction de rejet de transplantation.
C R ACAD SCI (PARIS), D, 278(9):1297-1299.

BAGNARA, JOSEPH T.
1974. The tail-darkening reaction of phyllomedusine tadpoles.
J EXP ZOOL 187(1):149-154.

BAKKER, ROBERT and PETER M. GALTON
1974. Dinosaur monophyly and a new class of vertebrates.
NATURE (LONDON) 248(5444):168-172.

BANTHORPE, D. V., F. L. PEARCE and C. A. VERNON
1974. Effects of nerve growth factor from the venom of Vipera russelli on dispersed sensory ganglion cells from the embryonic chick.
J EMBRYOL EXPER MORPHOL 31(1):151-167.

BATISTONI, R. and G. BARSACCHI
1974. Induction of in vitro maturation in oocytes of Triturus (amphibia Urodela).
EXPERIENTIA (BASEL) 15(1):77-79.

BAYSEL, F. and H. VURAL
1974. Effects of PGE_1 on the frog ventricular strip.
EXPERIENTIA (BASEL) 15(1):71-72.

BECKER, ROBERT O., SHARON CHAPIN and RICHARD SHERRY
1974. Regeneration of the ventricular myocardium in amphibians (Triturus viridescens).
NATURE (LONDON) 248(5444):145-147.

BEDFORD, J. M. and H. I. CALVIN
1974. Changes in -S-S- linked structures of the sperm tail during epididymal maturation, with comparative observations in sub-mammalian species.
J EXP ZOOL 187(2):181-204.

BEHLER, J. L.
1974. Bullfrog displaces California species.
ANIMAL KINGDOM 77(1):25.

BEHLER, J. L.
1974. Do alligators make good mothers?
ANIMAL KINGDOM 77(1):26.

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HYNOBIUS DUG OUT OF ICE

In June 1972 a Soviet geologist dug up a living Hynobius keyserlingi from alluvial deposits of the upper Quarternary period at a depth of 11 m. It survived for six months at the Institute of Zoology of the Academy of Sciences of the Ukranian SSR. On 20 December 1972 the salamander was killed and its age determined by the radiocarbon method. The results indicated the Siberian Hynobius 90 ± 15 years. This is considered a conservative estimate. (From 1971 Consultants Bureau, a division of Plenum Publishing Corp., New York, N.Y.)

HERPETOLOGICAL TECHNIQUES

HERP REVIEW publishes brief descriptions of novel herpetological techniques in order to make them available to the general herpetological community. The following format should be followed:

TITLE (The technique and the animal or group to which it applies - e.g., "Trapping Necturus" or "Marking Turtles".)

DESCRIPTION OF METHOD (As succinctly stated as possible; illustrations may be used.)

RESULTS & DISCUSSION (The technique's application might be criticized and it may be compared to other methods. Once again, brevity is at a premium.)

LITERATURE CITED (Only if compared with other methods which have been published.)

AUTHOR (Full name & address.)

If need be, submitted articles will be edited and returned for the author's approval.

Manuscripts should be sent to the section editor, Robert A. Thomas, Dept. of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843.

Dr. John Minnich of UWM has been invited to present a paper at the I.U.P.S. (International Union for Physiological Scientists) Satellite Symposium on Environmental Physiology from October 11-18 in Jerusalem, Israel. His paper is titled "Water Procurement and Conservation by Desert Reptiles in their Natural Environment".

REGISTRATION FORMS
SSAR-HL MEETING
12-14 AUGUST, 1974
AUBURN UNIVERSITY

The registration fee includes cost of meeting rooms, social, coffee breaks, printing and mailing, catfish fry, etc. Pre-registration is $10.00. Registration after August 2 and at the meeting will be $12.00.

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(Now published by the SSAR)

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

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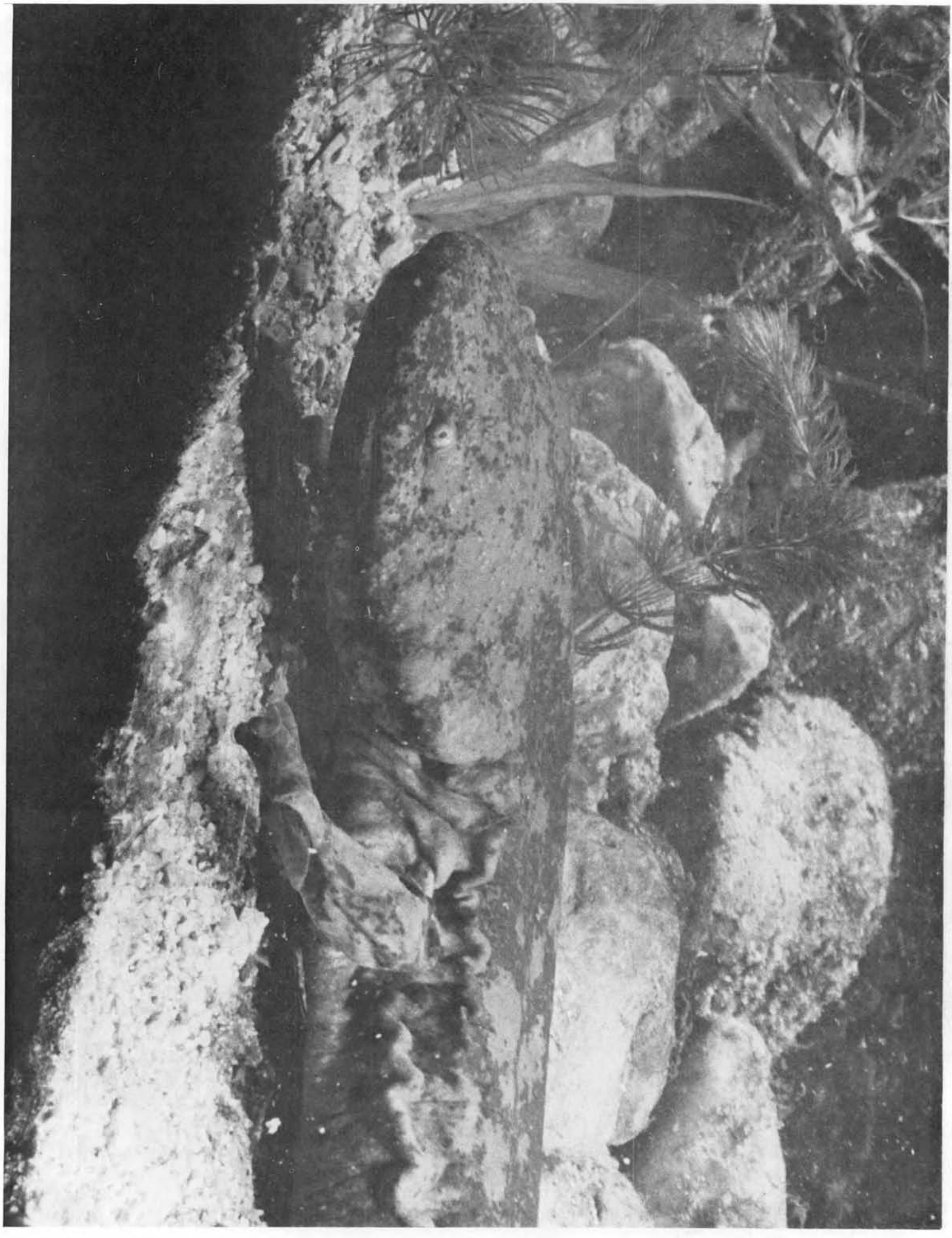
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BACK COVER

A giant Chinese Salamander, Andrias davidianus (Photo MPM-Mahlberg).





herpetological REVIEW

VOLUME 5, NUMBER 1

MARCH 1974

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Herpetological Review

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March 1974

CONTENTS

A LETTER FROM PAST-CHAIRMAN, ARDEN H. BRAME 2

EDITORIAL 3

THE TACOMA MEETINGS 4

SSAR COMMITTEE ASSIGNMENTS - 1974 6

SSAR-HL JOINT CONSERVATION COMMITTEE, 1974 7

THE MONTEVERDE CLOUD FOREST RESERVE 8

SSAR CONSERVATION FUND 10

SUMMARY--LACY ACT REVISION: IMPORTATION OF INJURIOUS WILDLIFE 11

CONSERVATION BRIEFS 11

ENDANGERED SPECIES ACT OF 1973 12

CURRENT LITERATURE PROJECT by Ron Heyer 13

NEW PUBLICATION SERIES 16

DISTRIBUTION RECORDS OF AMBYSTOMA LATERALE AND A. TREMBLAYI IN WISCONSIN by Jeffery L. Briggs 18

GEOGRAPHIC DISTRIBUTION 20

THE SIGMA XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1972-73 AND 1973-74 IN "HERPETOLOGY" 23

SSAR CONTRIBUTING AND SUSTAINING MEMBERS, 1973 24

CARIBBEAN RESEARCH 25

INDIVIDUALS & INSTITUTIONS 25

SSAR LIAISON COMMITTEE RARE & ENDANGERED SPECIES REPORT by Ray Ashton, Chairman SSAR Liaison Committee 26

THE CURRENT STATUS OF THE SANTA CRUZ LONG-TOED SALAMANDER - AN ENDANGERED ANIMAL by Stephen B. Ruth 27

ABOUT THE SSAR ELECTION 29

SSAR ELECTION RESULTS 29

ALFRED S. ROMER - OBITUARY 30

CALL FOR PAPERS - SSAR & HL MEETINGS 31

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PUBLISHER OF THE JOURNAL OF HERPETOLOGY, FACSIMILE REPRINTS IN HERPETOLOGY, AND THE CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

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February 4, 1974

TO: ALL SSAR MEMBERS AND FRIENDS

Dear Fellow Members:

I can now write as Past-Chairman! I have enjoyed immensely the privilege of serving you as Chairman of the SSAR in 1973, and I believe our society through our fine Board of Directors and Officers, has accomplished much. The future looks bright indeed! Thanks for all your support. I know you are giving and will give Jim Dixon that same kind of backing this year.

Some exciting things you can look forward to in the SSAR, are: 1) The resurrection of Herpetological Review to be issued four times per year at the same time as the Journal of Herpetology; 2) "Recent Literature in Herpetology" (to be published in each issue of Herp. Review, starting with No. 2, and which will fill much of the void left by the demise of HISS Titles); 3) "List of Common and Scientific Names of North American Amphibians and Reptiles" (to be published in our Circular Series); 4) Continued publication of both large and small facsimile reprints; and four substantial issues per year of the Journal of Herpetology.

Finally, on a personal note, I would like to recommend to each one of you that you consider the wonderful Creator of those animals we enjoy working with. For me, Jesus Christ is the hope of the past, present and future, and He is worthy of our acceptance and devotion. "But as many as received Him, to them gave He power to become the sons of God, even to them that believe on His name" (John 1:12). "All things were made by Him, and without Him was not any thing made that was made", (John 1:3).

Sincerely,

Arden H. Brame, Jr. II

Arden H. Brame, Jr. II
Past-Chairman

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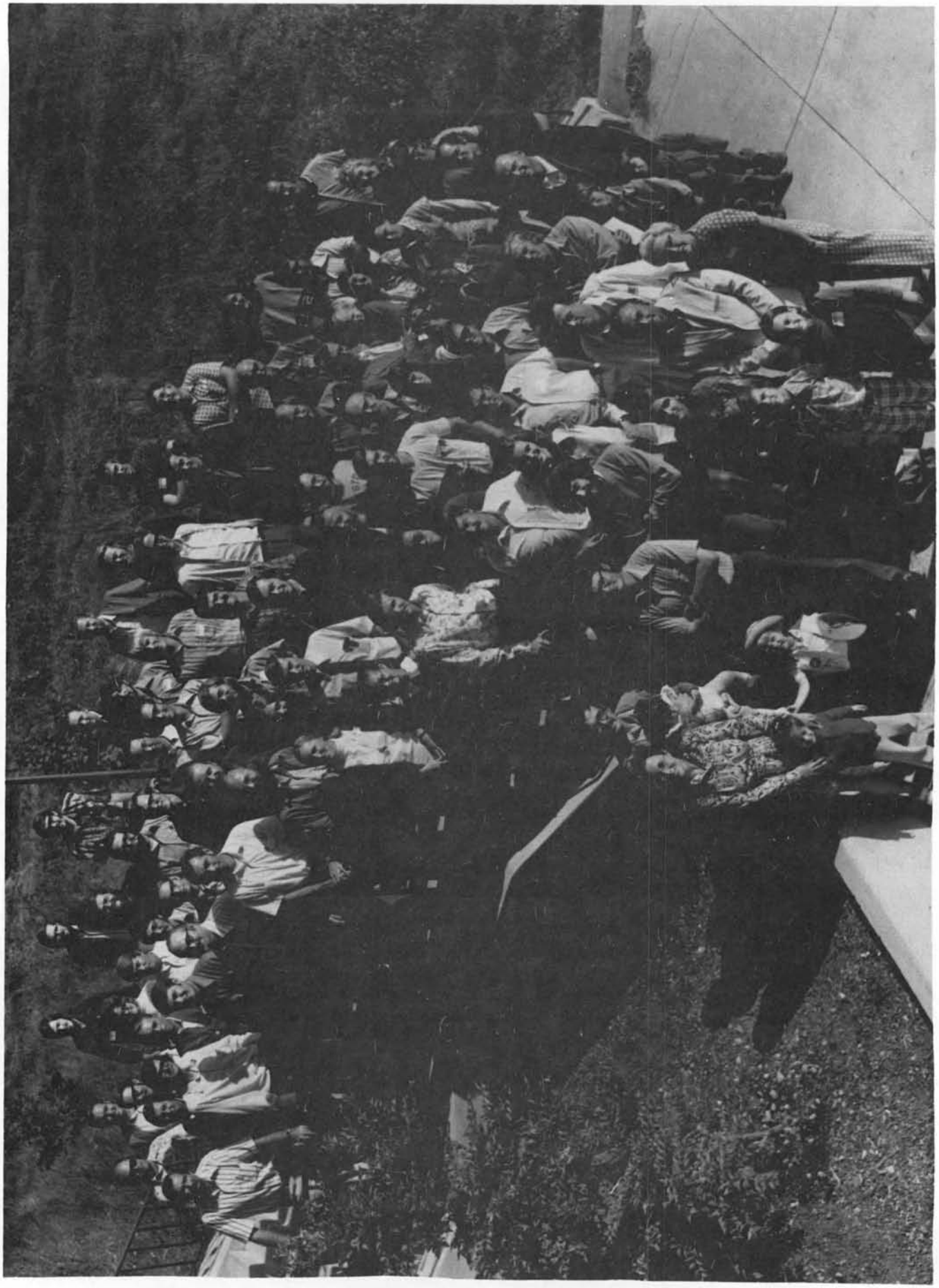
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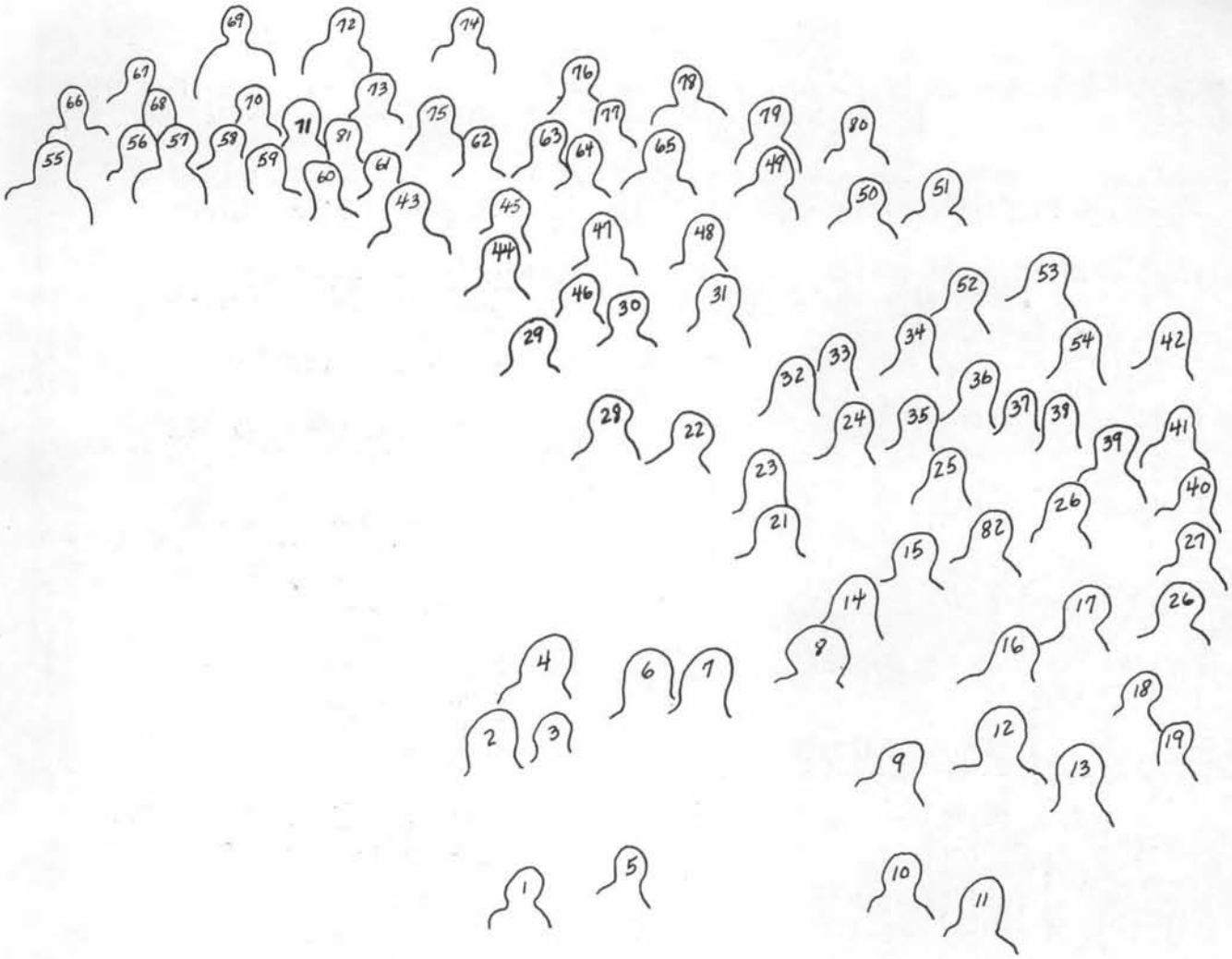
25 March 1974

E D I T O R I A L

With this issue we resurrect Herpetological Review. During the past year the herpetological community has been served, "experimentally" by HISS-News Journal. Despite the valiant efforts of Dr. Dowling, the HISS staff, SSAR and the Herpetologists' League, the HISS project has not become self-supporting. We have been informed that some HISS projects will continue. However, SSAR has again initiated publication of Herpetological Review to replace HISS-News Journal. This will be published quarterly, instead of six times annually and will be received by all SSAR members. We express our gratitude to Dr. Dowling and the HISS staff for their many contributions. They have not been in vain.

M.A.N.





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- Michael C. Long
- Joseph T. Collins
- Malvin L. Skaroff
- Stanley Dyrkacz
- Barbara Froom
- Robert A. Thomas

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Financial Planning (Resources)
- (not formed)

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- Henri C. Seibert (Publ. Sec.)
- James L. Christiansen (Asst. Publ. Sec.)
- J. P. Kennedy (J. of Herpetology)
- Max A. Nickerson (Herp. Review)
- Richard G. Zweifel (Catalogue)
- Stephen R. Edwards (Circulars)
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- Arden H. Brame, Jr.

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- Eric Pianka
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- John W. Wright
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- Lowell P. Orr
- Max A. Nickerson
- Ronald A. Brandon

- Fred S. Hendricks (HL)
- Max Hensley (HL)
- Philip W. Smith (HL)

Recent Herpetological Literature
- John W. Wright, Chairman
- C. Jack McCoy
- W. Ronald Heyer
- Max A. Nickerson

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SSAR - HL
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1974

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   Pullman, WA 91163

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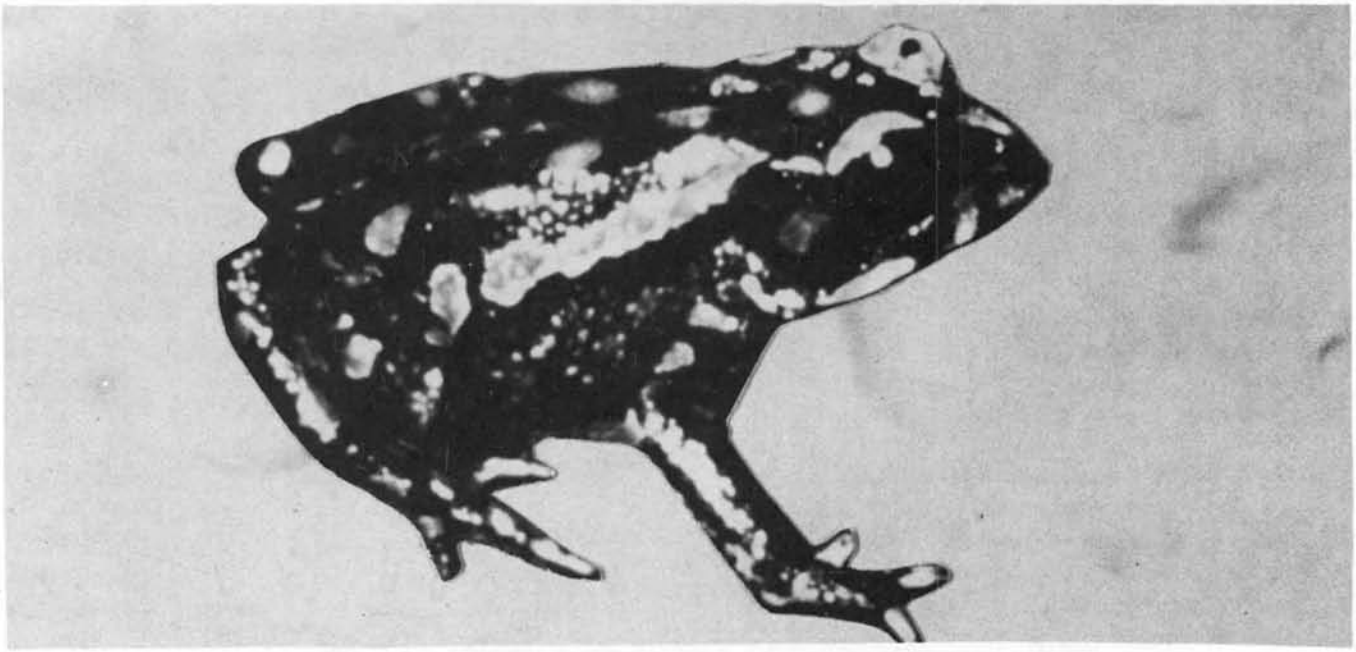
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A female *Bufo periglenes* (Photo: Arden Brame).

THE MONTEVERDE CLOUD FOREST RESERVE

With the present rapid destruction of low and middle elevation neotropical forests, it is significant that the Tropical Science Center of San Jose, Costa Rica is making an effort to preserve a section of Cloud forest in the Cordillera de Tilaren, Puntarenas Province (Fig. 1).

The Monteverde Cloud Forest Reserve, as the area is now known, should be of special interest to herpetologists as one of the world's most colorful toads, *Bufo periglenes* Savage (Fig. 2) is known only from a few hectares of the lower montane rainforest portion of the original tract acquired for the preserve. It is the presence of this striking animal that initially called attention to the area for preservation. In addition, there are 222 recorded species of birds, including the Resplendent Quetzal, the Three-wattled Bellbird, and the Umbrella Bird. Mammals include Baird's Tapir, Collared Pecarry, Brocket Deer, four cats (including Ocelot and Puma), and three species of monkey (White-faced, Spider and Howler).

The virgin forest at Monteverde is outstanding in itself. Areas that are exposed to severe wind have taken on the appearance of elfin or dwarf woodland and trees in less exposed areas are heavily festooned with up to 100 species of epiphytic plants. Fog and constant dripping from the leaves gives the forest a grotesque and fairy-like appearance. The existing reserve now encompasses three major bioclimatic life zones, three distinct bird communities, and an undetermined number of localized, plant and animal subcommunities.

Because of the comfortable temperatures, middle elevation forest has been the most heavily exploited climatic habitat in the neotropics. The high desirability of this area for living, agriculture, and grazing has caused extensive deforestation and few large unbroken and undistrubed areas of forestland remain within the middle-elevation belt today. Only because of its relative inaccessibility and cloudiness has the Monteverde vicinity been left undisturbed. Until recently land was abundant in areas with less

wind and rain, lower down the mountain, and in other parts of the country. Now, however, attempts at clearing and working cloud forest areas have been started by spontaneous squatters. In addition, speculative land dealings are the one economic venture that is consistently successful in this region and affluent North Americans are the primary target for the "speculative squatter". The presence of flourishing farms in the vicinity is enough to convince the ignorant land buyer that the higher, lusher cloud forest land is also productive. Thus, action must be taken soon to prevent the Cordillera de Tilaren from becoming nothing but unproductive clearings.

The Monteverde area lends itself well to protection or social value uses: (1) It is too wet, cloudy, and windy to use for cultivation or pasturing; (2) The forests are important as a watershed; and (3) Given the central position of the Cordillera de Tilaren massif and several of the country's largest cities and towns, the area has tremendous potential as a common ground for recreation, rest, inspiration, tourism, and other amenities of a developed society.

Costa Rica, in general, presents a picture of stability in government and enterprise and the Monteverde area is one of the most stable and conservation-minded parts of the country. There need be little fear that efforts and funds invested in the Monteverde Reserve will be wasted. A sanctuary such as Monteverde is necessary not only for casual observance but also for educational and scientific purposes as well. The Monteverde area, because of its accessibility, English-speaking Quaker community, radio contact with San Jose, and other conveniences, should be well suited for use by all three contingents.

The Monteverde Cloud Forest Reserve is being assembled in stages through a program of purchases and cooperative land holding agreements. So far a total of 2,425 acres have been purchased and these holdings encompass the entire known range of *Bufo periglenes*, but

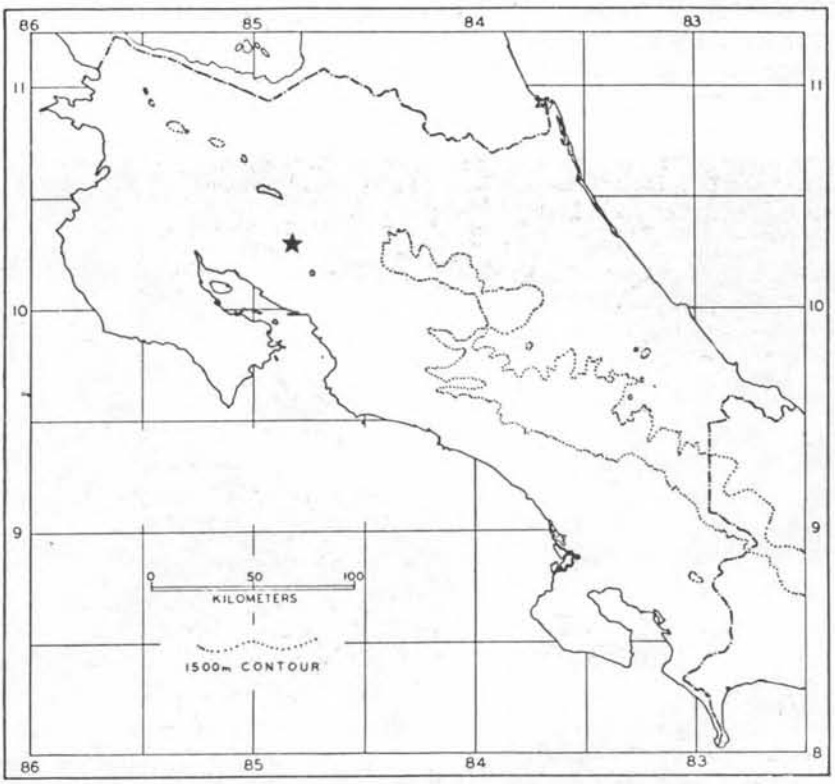


Fig. 1.--The location of the Monteverde Reserve is designated by the black star. (Map courtesy of Jay M. Savage)

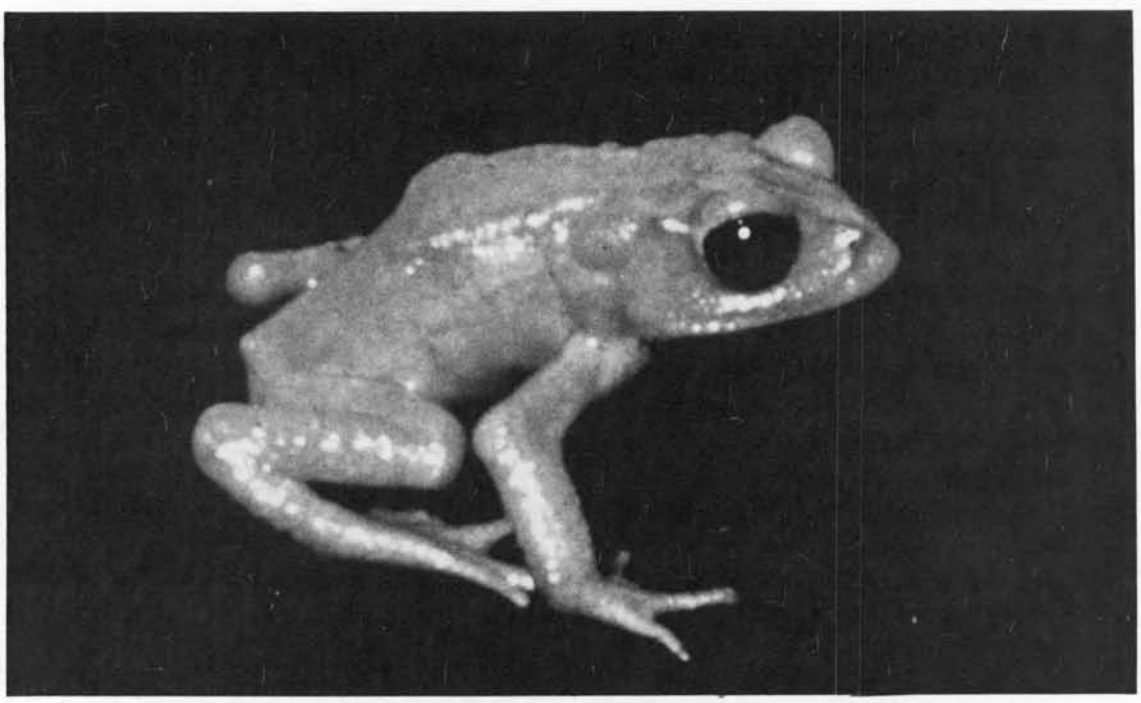
whether the size of the reserve is large enough to become self-sustaining (or an island surrounded by man's wasteland) is questionable. It is almost certain that some of the larger mammals and birds will not survive unless more of the forest is preserved. If anything meaningful is to be done to conserve a significant tract of this unspoiled forest, it must be done quickly or else short-term, short-sighted land uses practices, often stimulated by the United States' demand for great quantities of imported beef, will eliminate any possibility of preservation.

The Tropical Science Center of San Jose will serve as the recipient of donations, as well as legal guardian for the project. The Science Center is a Costa Rican organization, thus making all of its holdings tax-free. Money donated will enable the Science Center to hire guards for full-time surveillance for the reserve and to increase its land holdings.

ABSTRACTED FROM INFORMATION PROVIDED BY MONTEVERDE RESERVE COORDINATORS AND THE TROPICAL SCIENCE CENTER OF COSTA RICA.

SSAR CONSERVATION FUND

According to the Constitution and Bylaws of the SSAR (Art. II, Sec. 1) one of the Society's purposes is "To encourage conservation of wildlife in general and of amphibians and reptiles in particular." To date the Society has made no significant contributions to any organized conservation effort. Preceding is an abstract of reports provided by the coordinators of the Monteverde Cloud Forest Reserve Project. The money in the SSAR's Conservation Fund, if donated to this worthy project, would assist in the conservation of "wildlife in general" and a spectacular amphibian (*Bufo periglenes*) "in particular."



A male *Bufo periglenes* (Photo: Arden Brame).

Summary--Lacy Act Revision: Importation of Injurious Wildlife

The Department of the Interior has proposed a revision of the Lacey Act, which regulates the importation of injurious wildlife (i.e., foreign species deemed hazards to U.S.ecology, economy, or public health), which would greatly improve the regulatory authority over animal importations. In essence, this regulation will establish a list of "low risk" species which may be imported without permit. All unlisted species will require a permit for importation. These permits will be issued only where adequate facilities for secure maintenance of the species can be demonstrated or where other provisions for preventing escape and subsequent establishment can be assured--such as sterilization, importation of only specimens of like sex, etc. The intent is clearly to minimize the possibility of additional species introductions into the United States territory, not to interfere with bona fide scientific research or educational programs.

At the present time only Rana pipiens and Rana catesbeiana are included in the proposed "low risk" list of amphibians and reptiles.

Additional information can be obtained from the Director, Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior,Washington, D.C. 20240.

CONSERVATION BRIEFS

The Animas Mts., New Mexico, have been closed to collecting by an agreement between the owner, the Bureau of Sport Fisheries, USDI, and the State of New Mexico, to protect the ridge-nosed rattlesnake (*Crotalus willardi silus*) population and the habitat in general. Serious workers with a need to work in the area can request permits from the Bureau's regional office in Albuquerque.

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The Department of Interior has recently (December, 1973) proposed the green sea turtle (*Chelonia mydas*) and loggerhead, (*Caretta caretta*) for addition to the Endangered Species List. If these are added to the list, only the Pacific ridley (*Lepidochelys olivacea*) and flatback *Chelonia depressus* will remain unprotected. Comments on all three species should be sent to: Director, Bureau of Sport Fisheries and Wildlife, Washington, D.C. 20240.

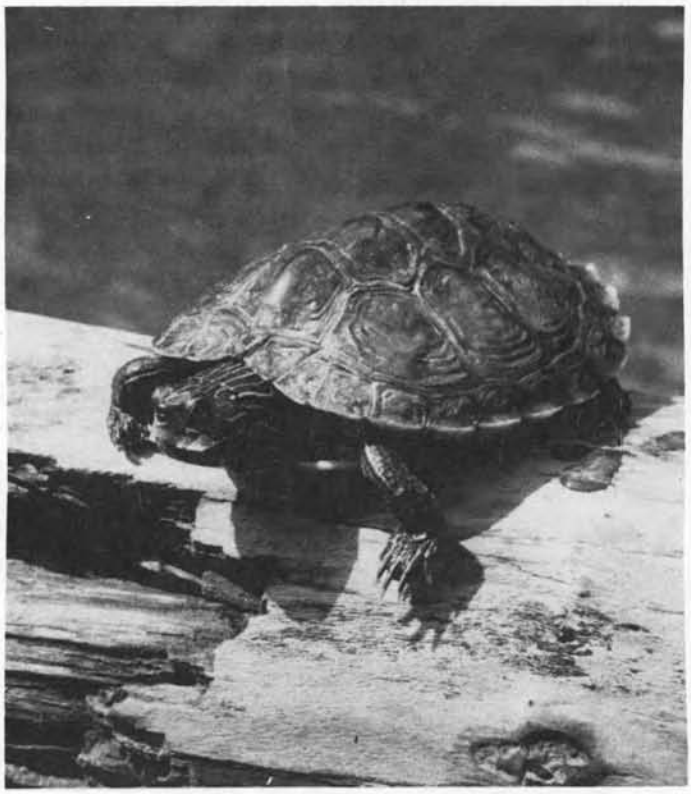
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Mona and Monito Islands, Puerto Rico, are seriously threatened by development for a massive superport. Mona has nine herp species, six of them endemic, including the Mona ground iguana, (*Cyclura stejnegeri*) and Mona boa, (*Epicrates monensis*). Monito is perhaps the best "birdrock" in the Caribbean. The loss of these islands would be tragic and of uncertain economic justification - it is unlikely that the port could compete with the superports planned for the mainland in Louisiana, Texas, and other Gulf states. Requests for the impact statement on this development and/or comments should be addressed to: Hon. Rafael Hernandez Colon, Governor of Puerto Rico, La Fortateza, San Juan, Puerto Rico.

Endangered Species Act of 1973

The Endangered Species Act of 1973 was recently passed by Congress and signed by President Nixon on December 28, 1973. This is a sweeping revision of the old 1969 Act and contains many new provisions. The full ramifications of this legislation will not be understood for quite awhile apparently; it will take considerable effort to develop a working set of regulations and to determine exactly how some of the definitions may be interpreted biologically.

A brief overview of this significant piece of legislation indicates points of special interest: (1) it implements the 1973 Convention on Trade in Endangered Flora and Fauna and will thus have considerable impact on commercial exploitation of herps.



A female *Graptemys geographica*, North Fork of White River, Ozark County, Missouri (Photo: Max Allen's Zoological Gardens).

commercial exploitation of herps. (2) it provides for Federal protection of U.S. endangered species if the individual States do not develop acceptable endangered species programs within 15 months--the 1969 Act did not provide for Federal protection except through habitat purchase, (3) it makes Land and Water Conservation Funds available again for purchase of these habitats, (4) it provides for a Federal Aid program to support State endangered species projects, (5) it establishes two official categories, endangered and threatened with endangerment, instead of the one endangered category of the 1969 Act (the previous "threatened" and "rare" categories of times past were just informal), (6) it expands the government's concern beyond "species" and "subspecies", taxonomically recognized, to "populations", thus raising the specter of a real biological nightmare, but allowing for the protection of biogeographically significant isolated, etc.,populations which have never been blessed with a formal name in the capricious application of taxonomic rigor, (7) it provides for a reasonable "management" approach to threatened species, instead of the rigorous protectionist approach required for truely endangered species; that is, a threatened species might still have special regulations written for it which will allow for reasonable "harvest" by scientists or, in the case of game species, hunters, while still protecting it from commercial exploitation. This allows for a more flexible approach to the whole issue of "endangered species" and points 5 and 6, in tandem, may well be the salient features of the 1973 Act from the herpetologist's viewpoints.

This Act has many other points of interest, too many to go into in detail here, and anyone wishing more information may request a copy from the Director, Bureau of Sport Fisheries and Wildlife, U.S.Department of the Interior, Washington, D.C. 20240.

CURRENT LITERATURE PROJECT

Ron Heyer, Coordinator
Amphibians and Reptiles
Natural History Museum
Smithsonian Institution
Washington, D.C. 20560

The SSAR appointed a committee to determine how current literature citations could be made available to the SSAR members consequent to the loss of HISS services. The committee, chaired by John Wright, made the following recommendation which was approved by the SSAR. The SSAR will continue to provide current literature citations to its membership through a program in which the source of literature citations will come from the herpetological community itself. In order to implement this program, three basic actions were taken.

1) The SSAR is supporting a part time secretary who prepares a photocopy listing of titles to be produced in Herpetological Review.

2) An interim coordinator for the project was appointed.

3) John Wright sent out an initial letter to 200 members asking them to voluntarily scan from 5-10 journals and send in the citations to the coordinator.

As the interim coordinator, I would like to briefly report on how the project will be run, the current status of the project, and how further help can be volunteered.

The Division of Amphibians and Reptiles of the National Museum of Natural History will be the coordinating center. Literature citation lists will be prepared based upon citations that have been sent to the coordinating center. The Division of Amphibians and Reptiles will not contribute any resources other than the coordinator's time because: 1) The idea of a volunteer program is experimental. In order to determine whether the program is successful, it should be run on its own. 2) The project has a 4 year time limit with the Division. In order for the project to be transferrable, it should not be tied to the gratuitous resources of any individual or institution. The lists, as they appear, will reflect the support of the general herpetological community, not the Division of Amphibians and Reptiles at the Smithsonian.

As of 14 February 1974 the response to John Wright's letter of 11 January 1974 was a total of 48 persons scanning a total of 253 journals. The part time secretary will scan four journals devoted to amphibians and reptiles. The first list will be printed in the next issue of Herpetological Review.

A list of the journals assigned as of 14 February is presented so that anyone who wishes to contribute to the program may do so. If you normally scan a journal or journals not listed, please write down the journals you scan, send the list to me and I will, in turn, indicate to you if they have been previously assigned. Once assigned a journal to scan, a 3 x 5 card should be sent to me for each article on amphibians and reptiles. The format is that previously used by HISS. Citations should be for articles appearing on or after 1 January 1974.

Finally, if anyone else is interested in coordinating the project, please contact me. I am interested in seeing the project be successful, but have no intrinsic interest in coordinating the project because of the kind of work involved.

Acta Anatomica
Acta TropicaA
Acta Zool. (Stockholm)
Acta Zool. Lilloana
Acta Zool. Mexicana
Acta Biol. Venezuelica
African Herp. Assoc.
African Wildlife
Amer. Antiquity
Amer. J. Anat.
Amer. Biol.

Amer. J. Path.
Amer. J. Trop. Med. Hyg.
Amer. Midland Natur.
Amer. Mus. Novitates
Amer. Natur.
Amer. Sci.
Amer. Zool.
Anales E.N.C.B. Mexico
Anatomical Record
Anim. Behavior
Anim. Kingdom
Anim. Learning & Behavior
Annals Carnegie Mus.
Annales Soc. Sci. Natur. Charente Maritime
Annales Sci. Natur.
Annual Review Ecol. & Systematics
Aquaria (Swiss)
Aquarium (German)
Aquariumwereld
Aquarien Magazin
Aquarien und Terrarien
Aquarien-und Terrarien-Zeitschrift
Aramco World Magazine
Archives d'Anat. microscopique
Arizoo
Artis
Audubon Magazine
Auk
Australian J. Biol. Sci.
Australian J. Zool.
Australian Soc. Herp.
Australian Zool.
Behaviour
Behav. Biol.
Biochem Biophys Acta
Biochem. Genetics
Biochem. J.
Biological Reviews
Biologisches Zentralblatt
Biologist
BioScience
Biota
Biotropica
Blijdorp Geluiden
Bonner zool. Beitrage
Bonner zool. Monographien
Brenesia
Breviora
Brigham Young Univ. Sci. Bull.
Bull. Amer. Mus. Nat. Hist.
Bull. Biol. France et Belgique
Bull. d'Ecologie
Bull. Florida State Mus.
Bull. I.F.A.N.
Bull. Los Angeles Co. Mus. Nat. Hist.
Bull. Mus. Comp. Zool. (Harvard)
Bull. Soc. Zool. France
Bull. Mus. Nat. Hist. Natur. Paris
Bull. Philadelphia Herp. Soc.
Bull. So. California Acad. Sci.
Bull. Univ. Nebraska State Mus.
Bull. Virginia Herp. Soc.
California Fish and Game
Cambridge Biol. Reviews
Canadian Amph. & Rept. Cons. Soc. Bull.
Canadian Field Natur.
Canadian J. of Zool.
Caribbean J. Sci.
Carolina Tips
Chicago Herp. Soc. Bull.
Chromosoma
Colorado Anthro.
Colorado Outdoors
Colorado-Wyoming Acad. Sci. J.
Comp. Biochem. Physiol.
C.R. Acad. Sci. (Paris)
Compte Rendu Seances Soc. Biogeographie
Condor
Conservationist
Contributions in Sci.
Cytogenetics
Developmental Biol.
Development, Growth, and Differentiation (Nagoya)
Ecological Monographs
Ecology
Endeavor
Engelhardtia
Environment Southwest
Evolution
Experientia
Federation Proceed.
Florida Natur.
Florida Wildlife
Forma et Functio
Gegenbaur's Morphol. Jahrb.
Gen. & Comp. Endocrinol.
Genetics
Great Basin Natur.
Helminthol. Soc. Washington, Proc.
Herp
Herp. Bull. New York Herp. Soc.
Herp. Soc. Japan
Herpetology
Herpeton
Ibis
Immunology
Irish Natur. J.
Israel J. Zool.
IUCN publications
J. Amer. Vet. Med. Assoc.
J. Anim. Ecol.

J. Applied Ecol.
J. Arizona Acad. Sci.
J. Auditory Res.
J. Cell Sci.
J. Comp. Physiol.
J. East Africa Natur. Hist. Soc. & Nat. Mus.
J. Embryology & Exp. Morph.
J. Endocrinol.
J. Experimental Zool.
J. Helminthol.
J. of the Hist. Biol.
J. Mammalogy
J. Mississippi Acad. Sci.
J. Morph.
J. Neurophysiol.
J. Paleontol.
J. Parasitology
J. Protozool.
J. Reproduction and Fertility
J. Roy. Soc. West. Australia
J. Tennessee Acad. Sci.
J. Wildlife Diseases
J. Wildlife Manage.
J. Zool. (London)
J. Theoretical Biol.
Kansas Fish & Game
Kansas School Natur.
Kentucky Happy Hunting Grounds
Kentucky Herp. Soc.
Kentucky Herp.
Kokl. Akad. Nauk. SSSR

Lab. Anim. Sci.
Letharia
Living Mus.
Loris
Mammalian Chromosome Newsletter
Maryland Herp. Soc. Bull.
Mem. Mus. Nat. Hist. Natur. Paris
Milwaukee Public Mus., Contr. Biol. Geol.
Milwaukee Public Mus., Publ. Biol. Geol.
Milwaukee Public Mus., Special Publ.
Misc. Publ. Mus. Natur. Hist. Univ. Kansas
Mississippi Game and Fish
Monographs Mus. Natur. Hist. Univ. Kansas
Mus. Argentino Cienc. Nat., Comun. Zool.
Mus. Argentino Cienc. Nat., Revista
Mus. Nac. Hist. Nat. Montevideo, Anales
Mus. Nac. Hist. Nat. Montevideo, Comun. Zool.
Mycologia
National Speleol. Soc. Bull.
Natur und Museum
Natural History
Nature (London)
Nebraska Bird Review
Neotropica
New Mexico Herp. Soc. Newsletter
N.Y. Acad. Sci. Annals
N.Y. Acad. Sci. Trans.
Nigerian Field
Northwest Sci.
Occ. Papers LSUMZ
Occ. Papers Mus. Natur. Hist. Univ. Kansas
Oecologia
Ohio J. of Sci.
Oryx
Palaeontology
Parasitology
Penn ar Bed
The Physiologist
Physiol. Rev.
Physiol. Zool.
Physis
Proc. Kon. Ned. Akad. Wensch. Ser. C. Biol. Med. Sci.
Proc. La. Acad. Sci.
Proc. Nat. Acad. Sci. USA
Proc. Soc. Exp. Biol. Med.
Psychonomic Sci.
Quart. J. Florida State Mus.
Quarterly Review of Biol.

Rec. West. Australian Mus.
Respiration Physiol.
Revista Biol. Tropical
Revista Brasileira Biol.
Revista Soc. Mexicana Hist. Natur.
Rev. Zool. Bot. Afr.
Salamandra
Science
Sciences
Serological Mus. Bull.
Sierra Club Bull.
Snake
Soc. Cienc. Natur. La Salle, Memorias
Soc. Sci. Natur. l'Quest France
Soc. Sic. Natur. et Physiques du Maroc
Soc. Venzolana Cienc. Nat., Boletin
Southwestern Natur.
Spiegel der Natuur
Stud. Fauna Curacao Caribb. Isl.
Systematic Zool.
Teratology
Terre et Vie
Texas J. Sci.
Theoretical Population Biol.

Toxicon
Trans. Illinois State Acad. Sci.
Trans. Kansas Acad. Sci.
Trans. Kentucky Acad. Sci.
Trans. Nebraska Acad. Sci.
Tulane Stud. Geol.
Tulane Stud. Zool.
Turtox News
Univ. California Publ. Zool.
Univ. Michigan Mus. Zool. Misc. Publ.
Univ. Michigan Mus. Zool. Occ. Papers
Vie et Milieu
West. Australian Natur.
Wilson Bull.
Wisconsin Herp. Soc. Newsletter
World Archeol.
Zeitschrift des Kolners Zoo
Zeitschrift fur Tierpsychol.
Z. Vergl. Physiol.
Zeitschrift zool. Systematik und Evolutionsforshung
Zoogoer
Zool. Africana
Zool. Garten
Zool. Jahrb. Abt. Anat. Ontogen. Tiere
Zool. J. Linn. Soc.
Zoologica Scripta
Zuid Afrikaans Panorama



Helmeted basiliscine, *Corythophanes cristatus* from Costa Rica (Photo: Robert W. Henderson).

NEW PUBLICATION SERIES

The Milwaukee Public Museum has announced three new publication series. The first numbers of each are herpetological in nature.

Publications in Biology and Geology

No. 1 The Hellbenders: North American "Giant Salamanders". Max Allen Nickerson and Charles Edwin Mays. In Press. 110 pp.

Contributions in Biology and Geology

No. 1 Resource partitioning among the snakes of the University of Kansas Natural History Reservation: a preliminary analysis. Robert W. Henderson.

Special Publications

No. 1 State Regulations for Collecting Reptiles and Amphibians in the Fifty United States. In Press. ca 70 pp.

DINOSAUR EGGS?

According to UPI sources in the Milwaukee Journal (18 February 1974), fossilized dinosaur eggs may have been discovered at Chateaneuf le Rouge in southeastern France. Last August, workmen digging a gas main for a new restaurant found a nest of eggshaped, stonelike objects. They weighed an average of 15 pounds and were 7 to 9 inches in length. It is believed that dinosaurs once ranged through nearby mountains. The restaurateurs indicated that they did not plan to make omelets out of them.

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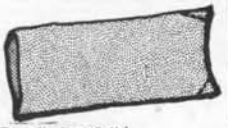
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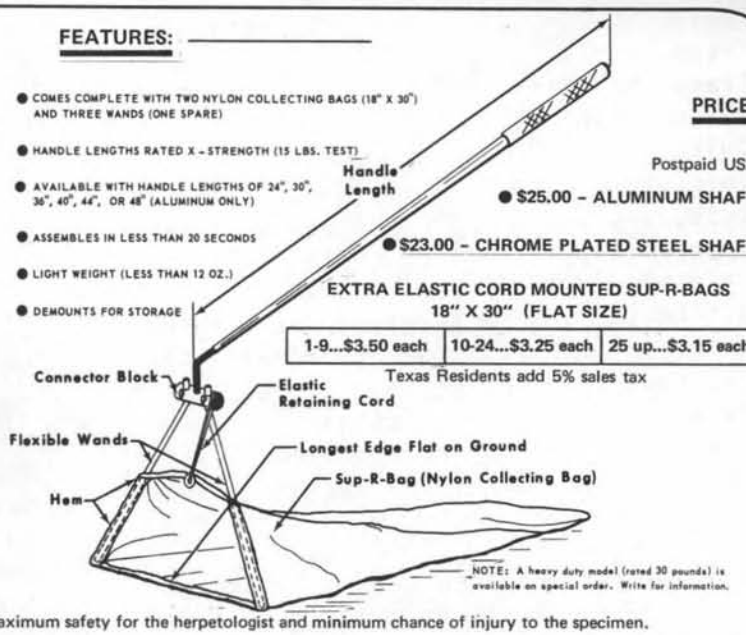
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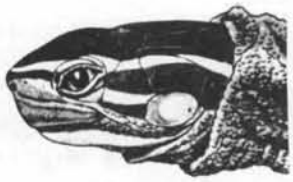
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P.p. i-xxvii, 1-185, 2 plates, map, 42 text figs.
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DISTRIBUTION RECORDS OF AMBYSTOMA LATERALE AND A. TREMBLAYI IN WISCONSIN

Jeffrey L. Briggs

The distribution of the triploid salamander Ambystoma tremblayi and its diploid relative Ambystoma laterale is not clearly defined in Wisconsin. The following collections were made in 1972 and 1973 by a number of individuals collecting throughout the state. Species designations were made by measurement of red blood cells suspended in amphibian saline. The major and minor axes were measured and cells approximately 25 by 40μ (785μ^2) were assigned to Ambystoma laterale. Cells approximately 30 by 50μ (1177μ^2) were assigned to Ambystoma tremblayi. All specimens have been deposited in the Milwaukee Public Museum (MPM) and confirmed by Max Nickerson.

AMBYSTOMA LATERALE (Blue-spotted salamander)

MPM-6664 Polk Co., Wi; Interstate Park, 2 mi S of St. Croix Falls; T34N, R19W, SW1/4 Sec. 36; Richard Vogt.

MPM-6665 Manitowoc Co., Wi; Point Beach State Forest; T20N, R24E, SW1/4 Sec. 16; 15 Nov. 1973; Richard Vogt.

MPM-6666-6674 Fond du Lac Co., Wi; SE shore of Little Mud Lake, North Kettle Moraine State Forest; T13N, R19E, NE1/4 Sec. 12; 10 Oct. 1973; Richard Vogt.

MPM-6675 Bayfield Co., Wi; Jakes Lake (S end of Pigeon Lake); 3.5 mi W of Drummond on County Hwy N; T45N, R8W, NE1/4 of NE1/4 of E1/2 of Sec. 35; 23 May 1973; T. Lukes.

MPM-6676 Ashland Co., Wi; 0.5 mi from Clam Lake turn off to Field Station; NW of village of Clam Lake; T43N, R4W, NE1/4 of SE1/4 of Sec. 30; 28 May 1973; Eddi Spangler.

MPM-6677 Bayfield Co., Wi; S side of Pigeon Lake, 3.5 mi W of Drummond, T45N, R8W, NE1/4 of NE1/4 of Sec. 35, 4 June 1973; Curtis Frye.

MPM-6678 Ashland Co., Wi; Crossing Hwy 72 2.4 mi E of junction M (village of Clam Lake); T43N, R4W, S1/2 of Sec. 34; 4 June, 1973; Joan Overgard.

MPM-6680 Bayfield Co., Wi; S side of Pigeon Lake, 3.5 mi W of Drummond. T45N, R8W, SW1/4 of Sec. 26; 21 May 1973; Mark Melius.

MPM-6681 Bayfield Co., Wi; 2100 meters S of E tip of Pigeon Lake, 3.5 mi W of Drummond; T45N, R8W, NE1/4 Sec. 35; 25 May 1973; Charles Benkendorf.

MPM-6682 Bayfield Co., Wi; 13.5 mi NE of Hayward on Hwy 77; T43N, R5W, Sec. 18; 31 June 1973; V. Aarthun.

MPM-6683 Bayfield Co., Wi; 3.6 mi S of Hwy 63 on US FS Rd. 213 out of Drummond, Wi. near Lake Owen; T44N, R7W, SW1/4 of Sec. 15; 4 June 1973; Charles Craig.

MPM-6684 Washburn Co., Wi; 50 yds from Bog 1/2 mi NE of Wayland Lake; T40N, R11W, NE1/4 of Sec. 24; 27 May 1973; John Colstad.

MPM-6685 Ashland Co., Wi; 6 mi SE of Grandview along the Morengo River; 1/3 mi E of FS Rd. 202; T44N, R5W, NE1/4 Sec. 4; 4 June 1973; Thomas Haberman.

MPM-6686 Ashland Co., Wi; 8.8 mi W of Hwy 13 on Hwy 77 out of Glidden; T43N R4W, SE1/4 Sec. 36; 24 May 1973; Dennis Menasco.

MPM-6687 Bayfield Co., Wi; 100 ft from shoreline at SE end of Pigeon Lake 3.5 mi W of Drummond; T45N, R8W, NE1/4 of NE1/4 of Sec. 35; 3 June 1973 Peter Nordgren.

MPM-6688 Ashland Co., Wi; 6.7 mi W of Hwy 13 on Hwy 77; T43N, R3W, SE1/4 of SE1/4 of Sec. 32; 24 May 1973; Mark Melius.

AMBYSTOMA TREMBLAYI (Tremblay's salamander)

MPM-6663 Price Co., Wi; Sheep Ranch Rd. in Chequamegon National Forest; T39N, R3E, SE1/4 of Sec. 34; 13 June 1973; Richard Vogt; Snout-vent length is 58.1 mm; internarial distance is 3.7 mm.

MPM-6679 (JLB-562) Ashland Co., Wi; 6 mi SE of Grandview along the Marengo River between US FS Rds. 377 and 384, T45N, R5W, SW1/4 Sec. 33; 4 June 1973; Jeffrey Briggs; Snout-vent length = 66.2 mm;internarial distance = 4.2 mm.

MPM-6689 Bayfield Co., Wi; 1.5 mi S of Hwy 63 on US FS Rd. 213 SE of Drummond; T44N, R7W, SW1/4 Sec. 3; 4 June 1973; Dennis Menasco; Snout-vent length is 63.4 mm; internarial distance is 3.6 mm.

MPM-6691 Oneida Co., Wi; 6 mi S of Three Lakes on Big Lake Loop Rd; 30 July 1972; Tom Pleyte; Snout-vent length is 63.1 mm; internarial distance is 3.8 mm.

Dept. of Biology
University of Wisconsin-Whitewater
Whitewater, Wisconsin 53190



Gliding frogs, *Rhacophorus*. (MPM Photo: Jan Mahlberg)

GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW publishes brief notices of new geographical records in order to make them available to workers in published form. The STANDARD FORMAT for a record is:

SCIENTIFIC NAME (Common name). Locality (air-line distance to nearest town); date; collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY. address.

Please submit new records in STANDARD FORMAT (short manuscripts are acceptable when data cannot be adequately presented in standard format) to George R. Zug, Division of Amphibians and Reptiles, National Museum of Natural History, Washington, DC 20560.

Recommended citation: Jones, J. 1974. Geographic Distribution: Rana pipiens. Herpt. Rev. 5(1):1.

NEW RECORDS

SALIENTA

RANA HECKSCHERI (River frog). U.S.A., Florida, Liberty Co., 6 miles S Bristol, Little Camel Pond; 3 September 1973; M. H. Kerr, M. J. Lodato, R. E. Herrington. Charles F. Walker. Univ. Michigan Mus. Zoo., UMMZ 132181-82, 132717. First record for county; extends Florida range west at least to the Apalachicola River. Submitted by MICHAEL J. LODATO, Middle Mississippi Valley Herpetologists, P.O. Box 2005, Evansville, IN 47714.

TESTUDINES

KINOSTERNON SONORIENSE (Sonora mud turtle). U.S.A., Arizona, Yuma Co., North Gila East Main Canal, 1 mile SW Laguna Dam (32 48'20"N - 114 29'40"W), elev. 150-160 ft.; 31 March 1962; R. S. Funk. R. S. Funk. Collection of R. S. Funk, RSF 468. Only other known localities along Lower Colorado River are two old records cited by Stebbins (1966, Field Guide Western Reptiles and Amphibians, p. 83) from Imperial Co., Calif. Submitted by RICHARD S. FUNK, Department of Biological Sciences, Southern Illinois University, Edwardsville, IL 62025.

SAURIA

ANELYTROPSIS PAPILLOSUS. Mexico, Queretaro, 2.5 mi S Conca at Ex-Hacienda San Niclaus Conca; 7-8 January 1974, S. Hayes, B. Adamcik & R. A. Thomas. R. A. Thomas. Texas Cooperative Wildlife Collection, Texas A&M Univ., TCWC 45502-04. First record in Rio Santa Maria valley and first literature record from state. Submitted by ROBERT A. THOMAS, Department of Wildlife and Fisheries Sciences,Texas A&M University, College Station, TX 77843.

OPHISAURUS ATTENUATUS LONGICAUDUS (Eastern slender glass lizard). U.S.A., Virginia, Powhatan Co., 20 mi SW Richmond; 8 October 1973; J. W. Steiner. J. C. Mitchell. Virginia Commonwealth Univ., VCU 156. Extends western edge of its Virginia range 20 miles further west. Submitted by JOSEPH C. MITCHELL, 3200 Stuart St., Richmond, VA 23221.

PHYRYNOSOMA DOUGLASSI BREVIROSTRE (Eastern short-horned lizard). U.S.A., Montana, Glacier Co., 17.2 kilometer SW Cut Bank, approximately 48° 30' N and 112° 25' W, elev. 1160 meters; 18 August 1973; J. K. Werner. J. K. Werner . Northern Michigan Univ. Mus. Zool. NMUMZ 7.1. Adult specimen, 62 mm body length. First record for Glacier County. Extends the range about 150 kilometers west of locality reported by Mosimann and Rabb (Copeia 1952(1):25). Submitted by J. KIRWIN WERNER, Department of Biology, Northern Michigan University, Marquette, MI 49855.

UMA SCOPARIA (Mojave fringe-toed lizard). U.S.A., Arizona, Yuma Co., 3.4 and 3.2 mile S junction of Arizona Hwy. 72 (by Ariz. Hwy. 95); 31 July 1965; R. S. Funk. R. S. Funk. Collection of R. S. Funk, RSF 1443-44. Yuma Co., 4 mile SE Parker; 5 August 1966; R. S.

Funk. RSF 1811-16. Yuma Co., 2 mile S junction of Ariz. Hwy. 72 (by Ariz. Hwy. 95); 5 August 1966; R. S. Funk. RSF 1817. Reported previously in Arizona from one specimen from 15 mi SE Parker (Elvin, Herpetologica (1960) 16 (1):31). Submitted by RICHARD S. FUNK.

SERPENTES

ARIZONA ELEGANS ELEGANS (Eastern glossy snake). U.S.A., Colorado,Logan Co., 5 kilometer S Sterling; 11 June 1973; R. R. Cohen. R. R. Cohen. Univ. Colorado Museum, UCM 50684. A second record for northeastern Colorado, approximately 85 kilometer WNW of Wray record (Dixon, Southw. Nat. (1959) 4:24) Submitted by ROBERT R. COHEN, Department of Biology, Metropolitan State College, Denver, CO 80204.

CHILOMENISCUS CINCTUS (Banded sand snake). Mexico, Sonora, 62.3 mile SE San Luis R. C.; 2 June 1962; J. F. Allen F. S. Funk. Collection of R. S. Funk, RSF 1066. Westernmost record for Sonora. Previous western record 40 mi NW Caborca, and nearest known locality 8 mi W Wellton, Yuma Co., Arizona. (Banta and Leviton, Proc. California Acad. Sci., ser 4, (1963) 31(11):309-327). Submitted by RICHARD S. FUNK.

DRYMOBIUS MARGARITIFERUS MARGARITIFERUS (Speckled racer). U.S.A., Texas, Cameron Co., National Audubon Society Palm Grove Sanctuary, 4.5 mile SE Brownsville; sighted 11 May 1972, Wayne R. Marion; 30 October 1972 and 6 March 1973, David R. Blankenship. J. R. Dixon and R. A. Thomas. Photograph of specimen deposited Texas Cooperative Wildlife Collection. Raun and Gehlbach, Dallas Mus. Nat. Hist. Bull. (1972)(2) stated that this form was known only from Cameron Co. and was perhaps extirpated. Our records show that it is still present in Cameron Co. Submitted by W. R. MARION, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843, and D. R. BLANKENSHIP, National Audubon Society, 721 Pine St., Rockport, TX 78382.

SISTRURUS MILIARIUS STRECKERI (Western pigmy rattlesnake). U.S.A., Missouri, Johnson Co., 6 mile E Warrensburg; 11 September 1971; T. J. Berger. J. L. Vial. Specimens destroyed by vandals. Range extension of approximately 150 mile N Barry Co. locality (Anderson, 1965, Reptiles of Missouri). Submitted by THOMAS J. BERGER, University of Missouri - Kansas City, Kansas City, MO 64110.

THAMNOPHIS MARCIANUS (Checkered garter snake). U.S.A., Arizona, Navajo Co. 3 miles S Show Low; 1 August 1966; D. M. Tuttle. R. S. Funk. Collection of R. S. Funk, RSF 1824. First known record in county, and an indication that this snake may penetrate the Mogollon Rim if record can be substantiated, for habitat seems unusual. Submitted by RICHARD S FUNK.

SHORT REPORTS

RECENT COUNTY RECORDS AND RANGE EXTENSIONS FROM SOUTHCENTRAL TEXAS. The following recent records supplement those of Raun and Gehlbach (1972, Amphibians and Reptiles in Texas, Dallas Museum of Natural History).

New county records: Kinney Co., *Scaphiopus couchi* (TNHC 42182-83, 42497-98), *Bufo punctatus* (TNHC 42089-91), *Bufo valliceps* (TNHC 42595), *Kinosternon flavescens* (TNHC 42164-78), *Masticophis taeniatus* (TNHC 42218) *Tantilla gracilis* (TNHC 42204); Maverick Co., *Chrysemys scripta* (TNHC 42571); Uvalde Co., *Drymarchon corais* (TNHC 42181); Zavala Co., *Rana catesbeiana* (TNHC 42194).

Range margin records: Kinney Co., *Crotaphytus collaris* (TNHC 42069), *Sceloporus variabilis* (TNHC 42080).

Range extension record: Kinney Co. 8 mile SW Brackettville, *Coluber constrictor* (TNHC 42278), extends range approximately 90 mile southwest. All specimens collected and identified by Michael R. Lewis; verification by Robert F. Martin. Specimens deposited in the Texas Natural History Collection (TNHC) of the Texas Memorial Museum, The University of Texas at Austin. Submitted by MICHAEL RAY LEWIS, Texas Memorial Museum, Austin, TX 78705.

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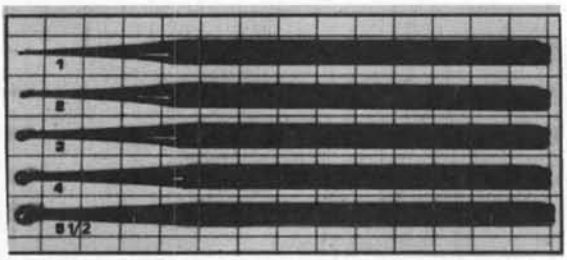
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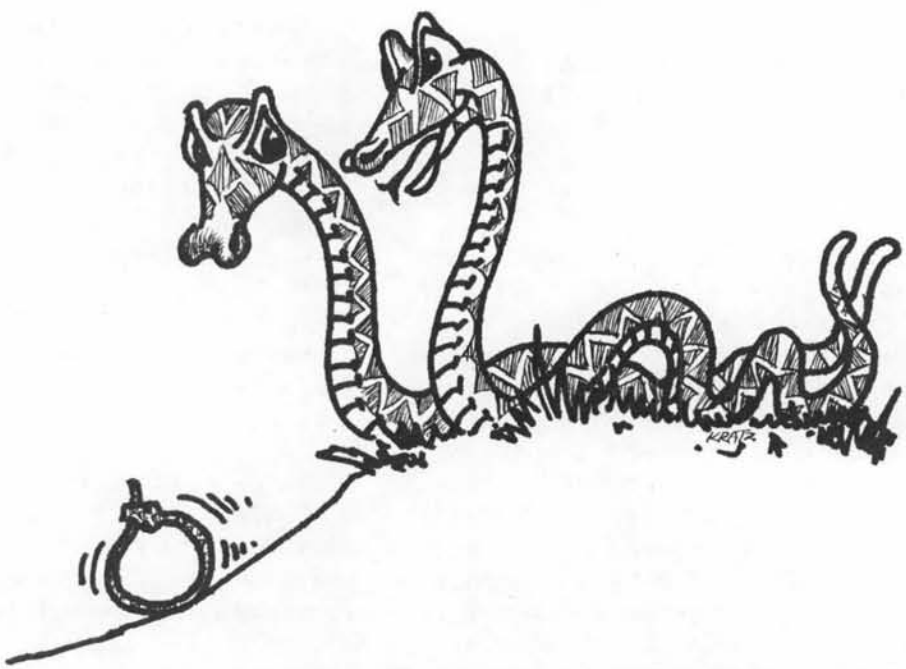
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THE SIGMA XI GRANTS-IN-AID OF RESEARCH AWARDS FOR 1972-73 AND 1973-74 IN "HERPETOLOGY"

Awards for 1972-73

J. W. EDWARD WORTHAM, Southern Illinois University. Spermatozoa of ambystomatid salamanders and their interspecific hybrids. $250.

CARLOS O. DIEFENBACH, University of Michigan. Thermoregulation and gastric digestion in *Caiman crocodilus* (Crocodilia: Reptilia). $100.

JAMES L. EDWARDS, University of California, Berkeley. A comparative study of locomotion in the Urodela. $200.

CARL H. ERNST, George Mason University, Fairfax, Va. An ecological study of the spotted turtle, *Clemmys guttata*. $100.

DONALD F. HARKER, University of Notre Dame. Bioacoustic study of Latin American anurans. $300.

HIROKO B. HOLTFRETER, University of Rochester. Electron microscopic studies of the reacting ectodermal cells during the neural induction of amphibian embryogenesis. $100.

LYNNE D.HOUCK, University of California, Berkeley. Reproductive biology of tropical salamanders. $300.

CLIFFORD R. JOHNSON, Lakeport, Calif. Head-body temperature control and heat distribution in rattlesnakes. $125.

JEFFREY W.LANG, University of Minnesota. Activity patterns and thermoregulatory behavior of crocodilians in Florida $100.

JOSEPH J. SCHALL, University of Texas. Comparative ecology of bisexual and parthenogenetic sympatric species of *Cnemidophorus*. $300.

MARIAN B. VINEGAR, Wilmington College, Wilmington, Ohio. Comparative aggression in lizards. $190.

ALBERT A. WILLIAMS, Southern Illinois University. Karyotypes and homologous chromosomes in some *Ambystoma* salamanders and their interspecific hybrids. $250.

Awards for 1973-74

LEONARD C. IRELAND, Oakland University, Rochester, Mich. Open ocean behavior of the hatchling green sea turtle (*Chelonia mydas*). $100.

PHILIP A. MEDICA, University of Southern California, Los Angeles. Interactions between two closely related species (*Callisaurus draconoides* and *Holbrookia texana* [= *Cophosaurus*]) at the periphery of their distribution in a sympatric situation in northwestern Arizona. $125.

JOSEPH C. MITCHELL, Virginia Commonwealth University. Geographic variation of *Elaphe g.guttata* (Reptilia, serpentes) in the coastal plain. $150.

JAMES J. TALBOT, University of California, Los Angeles. Ecological and evolutionary relationships among lizards of the genus *Anolis* from Costa Rica. $150.

DENNIS S. TOMKO, Northern Arizona University. A behavioral taxonomic study of the collared lizards. $150.

SISTER MARY L. WRIGHT, College of Our Lady of the Elms, Chicopee, Mass. Effect of thyroxine and prolactin on the cell cycle in tadpole limb epidermis. $150.

The SSAR wishes to thank the following Contributing and Sustaining Members who donated an excess of $300 during 1973. This money enabled the SSAR to publish its first number in the new Circular series. We hope this kind of support will be continued and even augmented during 1974.

CONTRIBUTING MEMBERS FOR 1973

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CARIBBEAN RESEARCH

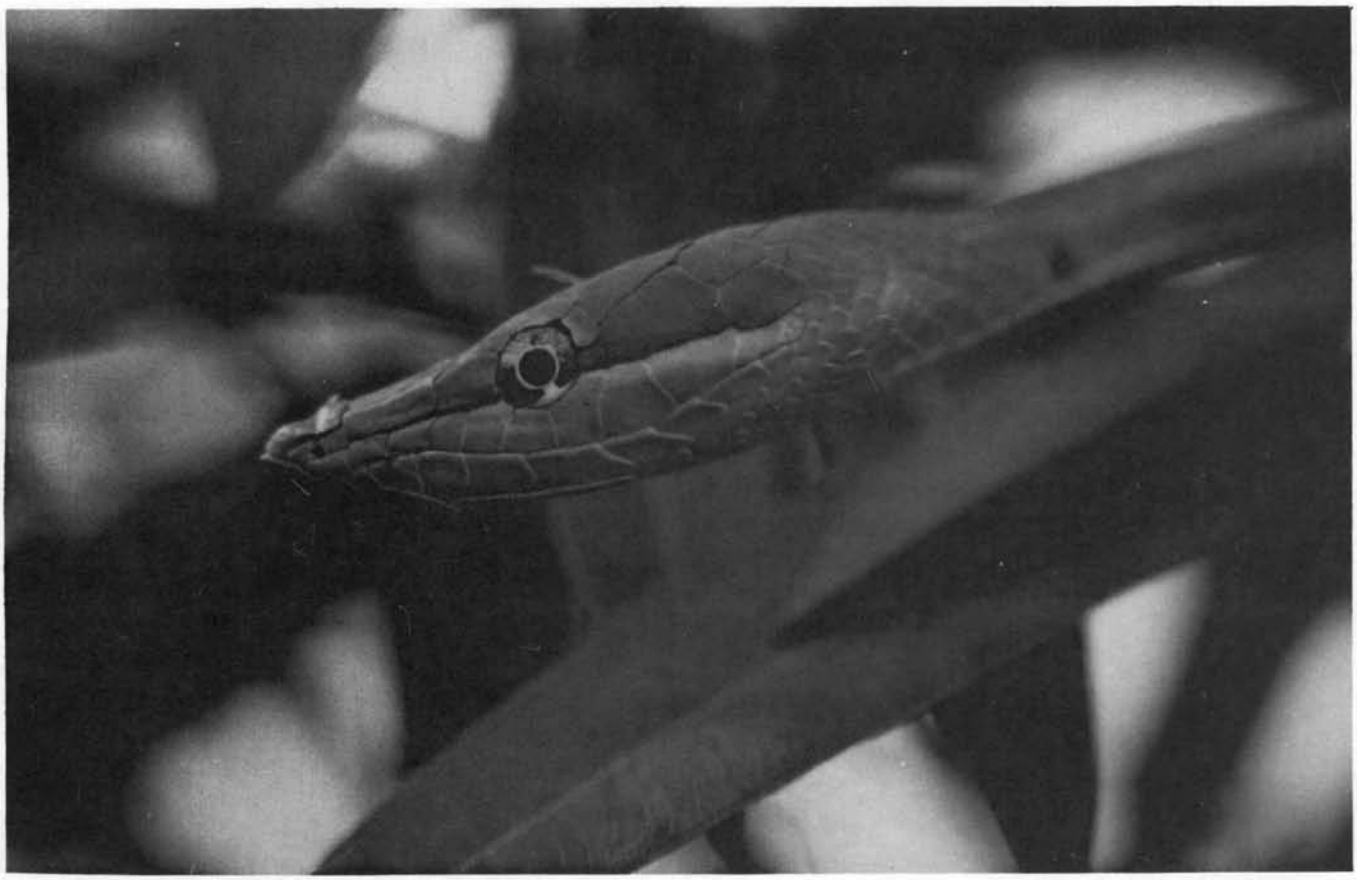
THOMAS A. JENSSEN (Dept. of Biology, Virginia Polytechnic Institute, Blacksburg, Virginia 24061) has completed his field work on Jamaican *Anolis*. The fifteen month project (1970-1971) produced considerable ethoecological data on several species, with the emphasis on *A. opalinus*. Tom has continued his anole work on the mainland where he has spent the past two summers studying the social behavior of *Anolis limifrons* in Panama.

THOMAS MILTON (Dept. of Biology, VPI, Blacksburg, Virginia 24061) is working on the possible social significance of the vocalizations of *Anolis grahami*. He has made two short trips to Jamaica to initiate the study.

STEPHEN D. BUSACK (Bird and Mammal Labs, National Museum of Natural History, Washington D.C. 20560) and RON CROMBIE (USNM) will be spending two weeks in the Swan Islands in February. Their primary interest will be *Aristelliger* but they hope to make a full census of the herpetofauna of these infrequently visited islands.

INDIVIDUALS AND INSTITUTIONS

ROBERT W. HENDERSON of the Milwaukee Public Museum is studying feeding behavior, perch selection, and vertical movements in the neotropical arboreal snake genera *Imantodes*, *Leptophis*, and *Oxybelis*.



Green vine snake, *Oxybelis fulgidus*, from Honduras. (Photo: Robert W. Henderson.

SSAR Liaison Committee
Rare and Endangered Species Report
by
Ray Ashton,
Chairman SSAR Liaison Committee
Museum of Natural History
University of Kansas

The SSAR Liaison Committee to Regional Herp Societies is well into the project of collecting information on the status of rare and endangered species of amphibians and reptiles on a state by state basis. The Committee will send report forms to any individual or group who has the interest and expertise on a state's herptofauna and wishes to have input into this report. A form for each candidate species should be completed and includes information about range, number of specimens representing the species in collections, status of the habitat, etc. Not all of this information will be published in the report but is used to evaluate the species' situation and whether it should be included in the published report. Also, all the raw data will be maintained at the University of Kansas as well as a list of resource people in each state. This information may be valuable to state and federal conservation departments and other groups that may need such information for such things as environmental impact statements and the development of new laws. Exact information on the location of populations will not generally be made public due to potential collecting pressures.

In the end, I hope to put together a report on the U.S. and Canada which will be published and distributed by the SSAR. Hopefully, this will be done by early 1974.

Regional Societies

If your regional society hasn't heard from a member of the Liaison Committee, send a letter to the Committee member in your region and let them know what your society is doing. The members are: Chairman, Ray Ashton, Museum of Natural History, University of Kansas, Lawrence, Kansas; Rocky Mountain Area, John S. Applegarth, P.O. Box 91, Durango, Colorado; Southeast, Robert Thomas, Department of Wildlife and Fisheries, Texas A&M University, College Station, Texas; West Coast, Michael Long, 1206 Electric Avenue Apt. G, Alhambra, California; Midwest, Joseph T. Collins, Museum of Natural History, University of Kansas, Lawrence, Kansas: Canada, Barbara Froom, 8 Preston Place, Toronto 12, Ontario, Canada; and Eastern Seaboard, Marvin L. Skaroff, 1025 Lakeside Drive, Philadelphia, Pa.

SHORTAGE OF RANA CATESBEIANA

IN CALIFORNIA

An article by Jerry Belcher in the San Francisco Sunday Examiner & Chronicle for 20 January 1974 reported that the bullfrog, Rana catesbeiana, is in short supply for scientific supply houses and restaurants. The California Fish and Game Commission has put an indefinite ban on frog hunting of all kinds in Glenn, Colusa, Butte, and Placer Counties. Possible reasons given for the decline of the bullfrog were habitat destruction, pesticides, and poaching. The Fish and Game Commission has authorized a 3-year, $30,000 study to develop a bullfrog management program.

THE CURRENT STATUS OF THE SANTA CRUZ LONG-TOED SALAMANDER - AN ENDANGERED ANIMAL

Stephen B. Ruth

ABSTRACT:

Ambystoma macrodactylum croceum, recently threatened with extinction due to habitat destruction, now appears to have a hopeful future. Studies have shown that the salamanders still exist in good numbers at both previously known sites. The two breeding pond habitats have been purchased as ecological reserves by the State of California. Current research is documenting the extent of terrestrial habitat used by the salamanders. An additional population has been discovered.

Bury and Ruth (1972) reviewed the status of *A. m. croceum*. At that time there were two known populations, and the outlook for their continued survival appeared bleak. A brief resume follows.

The pond at the Valencia Lagoon site had been inadvertently drained due to freeway construction in early 1972. The effect of this action was brought to the attention of the California Division of Highways. Following discussions with federal and state officials and scientists from the University of California, Berkeley, the Highway Division indicated a desire to do what it could to rectify the situation. As an interim measure, an artificial salamander pond 250 feet long by 50 feet wide was built within the highway right of way. The pond was completed in late 1970. At the time of our 1972 report there was no indication that salamanders were using the man-made pond. The remaining two and half acres of former pond habitat adjacent to the freeway was in private hands. The property was zoned commercial, and the owner had plans for filling the area and building an office complex on it.

In the fall of 1971 the other salamander breeding area, known as Ellicott Pond, was in imminent danger of being destroyed by the planned development of a mobile home park. A "lease on life" was granted the salamanders when the Santa Cruz County Board of Supervisors denied a rezoning request by the property owners which, if approved, would have allowed construction to begin.

During the eco-political battle to save the salamanders, it became obvious that not enough was known about them. In January of 1972 studies of *A. m. croceum* were initiated by graduate and advanced undergraduate students working under the direction of Dr. Robert C. Stebbins of The Museum of Vertebrate Zoology, University of California at Berkeley.

In 1972 research was concentrated primarily on determining the number of salamanders using the two sites. Both breeding ponds were encircled with drift fences made of tar paper. Salamanders were captured in can traps and were marked by toe clipping and released. This study and subsequent work has shown that approximately 500 salamanders still exist at Valencia Lagoon and 8,000 - 9,000 at Ellicott Pond.

Once this information had been gathered the California Department of Fish and Game asked for and got funds for habitat acquisition. A 30 acre parcel at Ellicott Pond was purchased for $85,000 by the State in May of 1973 from funds raised through motorists' purchase of personalized license plates. In July of 1973 the portion of Valencia Lagoon which was still in private hands was acquired by the State with $34,500 from license plate funds and a $15,000 gift from Mr. and Mrs. Carlyle Miller, the property owners.

Research in 1973 and 1974 has been concentrated on determining the direction and timing of the breeding migrations as well as the extent of the terrestrial habitat used by the adult salamanders in the vicinity of the ponds. Information on habitat utilization by the adults is especially critical if a viable salamander reserve is to be created. Protection of the pond environment will not be enough to protect this amphibian given the two phases of its life cycle; one aquatic and one terrestrial. The Bureau of Sport Fisheries and Wildlife of the United States Department of the Interior is considering purchasing upland areas that need to be added to the reserves created by the State. At the moment most of the oak-woodland and chaparral habitat surrounding the two ponds is in private hands, and extensive development of these lands could undo most of the hard work that has been done.

In addition the studies have shown that the artificial pond created by the California Division of Highways at Valencia Lagoon was being used by the salamanders. This pond was expanded in November of 1973 to provide additional breeding habitat for the salamanders. The California Department of Fish and Game is negotiating with CALTRANS (formerly the California Division of Highways) to implement a recovery plan drawn up by scientists at Berkeley for the salamanders at the Valencia site. This plan calls for partial damming of the freeway drainage channel in order to reflood the old pond bottom.

In October of 1973, an additional population of Santa Cruz Long-toed Salamanders was discovered in Monterey County one mile north of Moss Landing. The size of this population is not known. Agricultural lands and a salt water marsh nearly surround the pond and willow grove area, where virtually all of the salamanders are presumed to exist.

The necessity of working on an endangered animal on private property as well as the need for constant communication among the many agencies and individuals involved has often confounded and complicated the research effort.

It is hoped that future work will determine the size of the Moss Landing population. The extent of the terrestrial habitat needs to be studied further with more emphasis on areas away from the ponds. In addition a thorough search needs to be made for other populations of this salamander especially in northern Monterey County.

Research on the Santa Cruz Long-toed Salamander has been carried out by students in the Museum of Vertebrate Zoology under the direction of Dr. Robert C. Stebbins. They have been assisted in the field by private citizens and students from the Biology Department at Cabrillo College. Portions of the research effort have been funded by the California Division of Highways, the California Department of Fish and Game, the Bureau of Sport Fisheries and Wildlife, the Martens Fund of the Museum of Vertebrate Zoology, and by the researchers, themselves.

SELECTED REFERENCES

ANDERSON, J.D. 1960. A comparative study of coastal and montane populations of *Ambystoma macrodactylum*. PhD thesis. University of California, Berkeley.

BURY, R.B. 1971. Status report on California's threatened amphibians and reptiles. Admin. Report No. 72-2. Inland Fisheries, California Department of Fish and Game.

BURY, R.B. and S.B. RUTH. 1972. Santa Cruz Long-toed Salamander: survival in doubt. Herp. Rev. 4(1): 20-22.

FERGUSON, D.E. 1968. *Ambystoma macrodactylum*. Catalogue of American Amphibians and Reptiles.

RUSSELL, R.W. and J.D. ANDERSON. 1956. A disjunct population of the Long-nosed (sic.) Salamander from the coast of California. Herpetologica 12 :137-140.

RUTH, S.B. and K. TOLLESTRUP. 1973. Aspects of the life history and current status of the Santa Cruz Long-toed Salamander *(Ambystoma macrodactylum croceum)* at Valencia Lagoon, Santa Cruz County, California. Report for California Division of Highways.

Museum of Vertebrate Zoology
University of California
Berkeley, California 94720

About the SSAR Election!

Since the Tacoma meetings, SSAR has not had the services of HISS to provide mailing labels. Thus, although SSAR ballots were prepared for mailing during September, 1973 there were no additional membership labels for separate mailings. Our ballots had to wait until J. of Herpetology 7(4) was mailed from Ann Arbor in late November. Obviously, the 15 October deadline for ballot receipt was ignored! All ballots received prior to 1974 were counted.

SSAR ELECTION RESULTS

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Athens, Ohio 45701

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ALFRED S. ROMER DIES

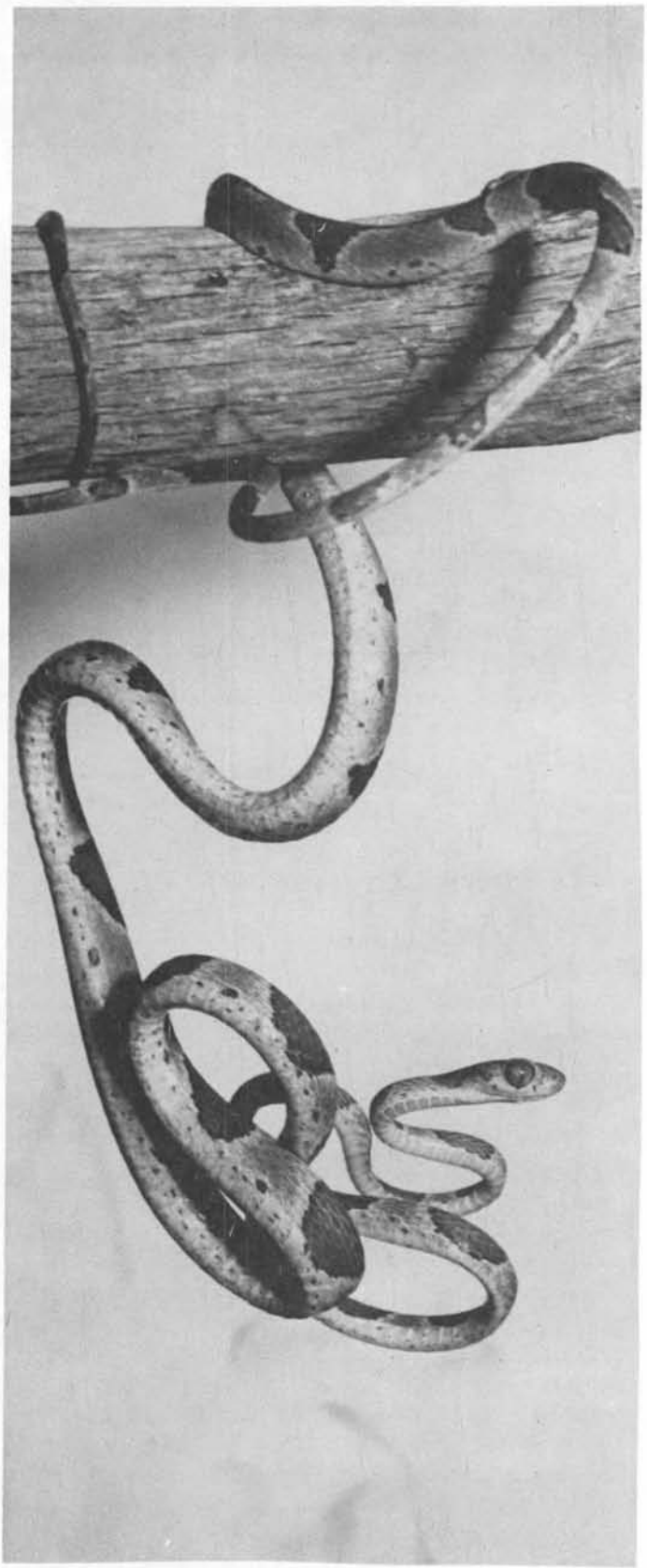
Alfred S. Romer, AAAS president in 1966 and a member of the Association for 50 years,died in November in Washington, D.C. He was 79.

Romer, professor emeritus of zoology at Harvard University, was an authority on vertebrate biology. He was noted for his studies on the braincase and for his reconstruction of the nerves of extinct fish, amphibians, and reptiles. After his retirement in 1965, Romer continued his research at Harvard's Museum of Comparative Zoology.

Romer served as AAAS president-elect in 1965, chairman of the Board of Directors in 1967, chairman of the Committee on Council Affairs in 1965, and chairman of the Committee on Nominations and Elections in 1966.

He had also been president of the Society for the Study of Evolution, the Society of Vertebrate Paleontology, the American Society of Zoologists, and the Society of Systematic Zoology. Among the many honors he received were the Thompson Medal of the National Academy of Sciences, the Academy's Elliot Medal, and the Penrose Medal of the Geological Society of America.

From AAAS Bulletin, January 1974



Imantodes cenchoa from Honduras.
(Photo: Robert W. Henderson)

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Members have voting privileges in the Society. They receive the JOURNAL OF HERPETOLOGY (3-4 issues/year), HISS NEWS JOURNAL (6 issues/year), and FACSIMILE REPRINTS IN HERPETOLOGY (2-3 issues/year). They may purchase other Society publications at reduced rates.

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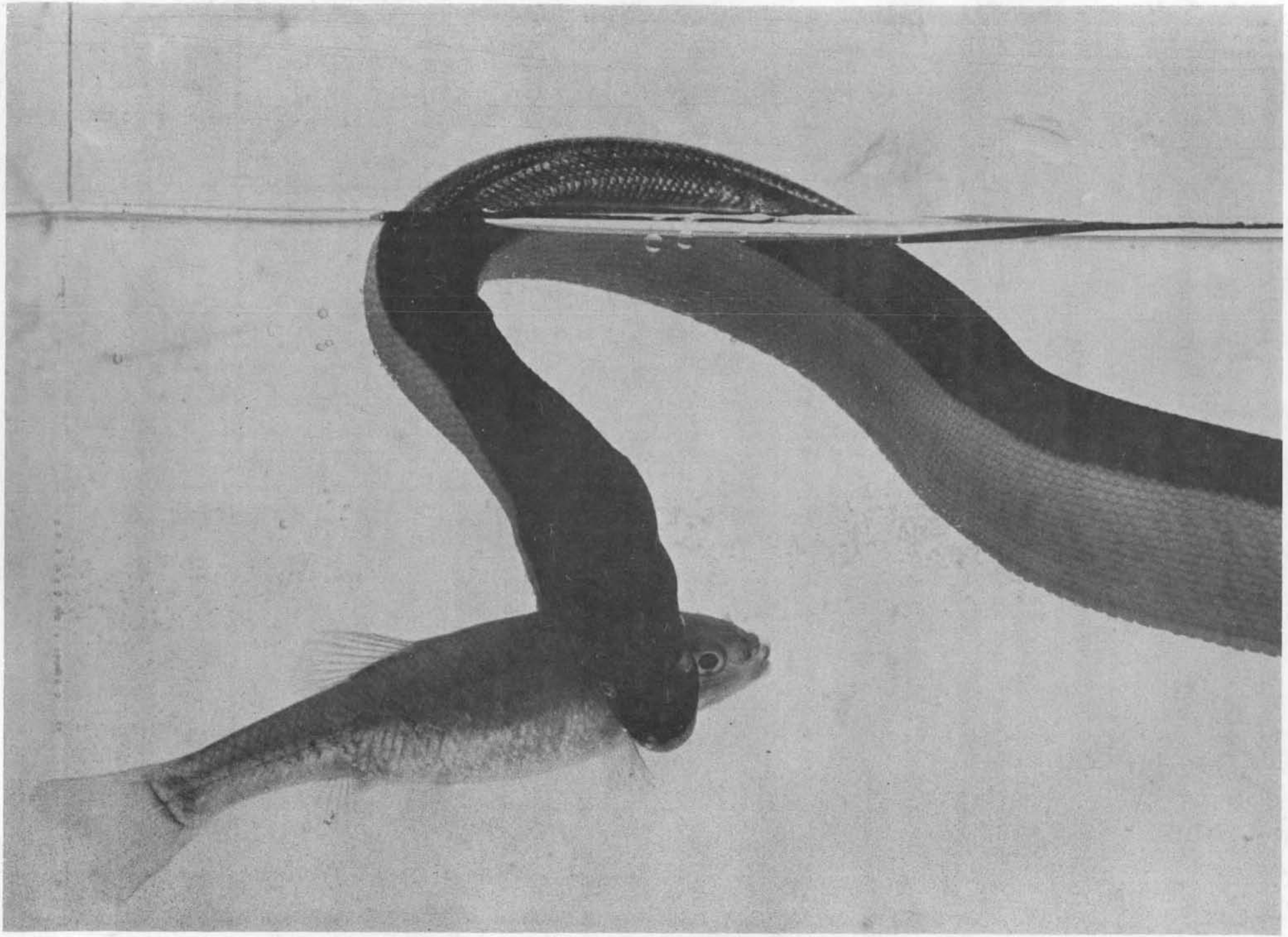
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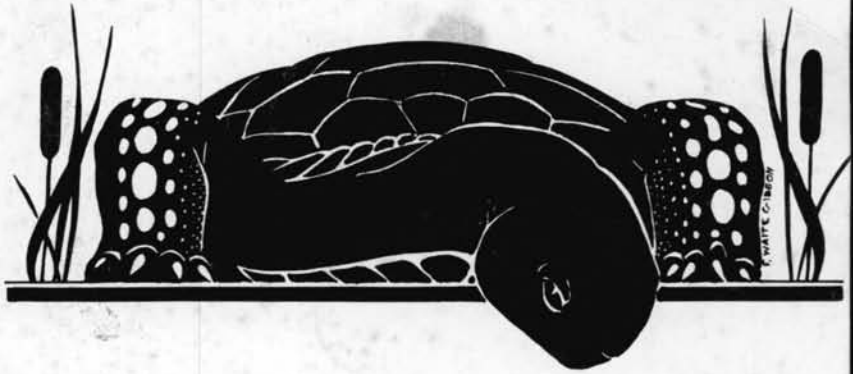
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BACK COVER

A feeding Yellow-bellied Sea Snake, *Pelamis platurus*, from Bahia de Culebra, Costa Rica. (Photo MPM-Mahlberg)





herpetological REVIEW

FINAL ISSUE

THE NEWSLETTER ON AMPHIBIANS AND REPTILES...
AND THE PEOPLE WHO STUDY THEM

VOLUME 4, NUMBER 6
DECEMBER 1972

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as the OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information of these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communication between amateur and professional workers. (See Third Cover for membership information.)

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Herpetological Review

Produced for the

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

and the

HERPETOLOGISTS' LEAGUE

by

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS

***

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HERPETOLOGISTS

LEAGUE

The Herpetologists' League is an international organization which was established in 1936 by Major Chapman Grant. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1971 it had 900 members and fellows (including Life and Honorary members), and more than 400 institutional subscriptions to its journal, HERPETOLOGICA, which has been published continuously since 1936.

All persons interested in herpetology are eligible for membership. (See Third Cover for membership information.)

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Herpetological Review

VOLUME 4, NUMBER 6

DECEMBER 1972

A NOTE TO LIBRARIANS:

This is the

FINAL ISSUE

of

HERPETOLOGICAL

REVIEW.

Succeeding publications

are

HISS NEWS-JOURNAL

and

HISS TITLES & REVIEWS.

-- NEWS & ANNOUNCEMENTS --

194 EDITORIAL

195 CALENDAR & NOTICES

197 THE WASHINGTON MEETING: Program and Abstracts.

204 REPORT ON THE SSAR-HL LAKE TEXOMA MEETING, by Max A. Nickerson.

206 AN IMPORTANT REPORT TO SSAR MEMBERS, by C. J. McCoy.

-- DEPARTMENTS --

CONSERVATION

204 SSAR RESOLUTIONS ON CONSERVATION.

REPORTS

196 REPEATED MATING OF A COPPERHEAD AND TIMBER RATTLESNAKE, by P. W. Smith & L. M. Page.

202 AN UNUSUAL SPECIMEN OF AMEIVA UNDULATA (SAURIA: TEIIDAE) FROM YUCATAN, MEXICO, by Jeremy E. Penner.

203 NESTING SITES, EGGS and YOUNG, of HEMIDACTYLUS MABOUIA FROM CARRIACOU, WEST INDIES, by George B. Pendlebury.

208 AUSTRALIAN ANURAN CHROMOSOME NUMBERS, by David S. Woodruff.

209 CURRENT HERPETOLOGICAL TITLES: XXIII. 1971-1972.

BOOK REVIEW

219 ANFIBIOS DE NICARAGUA: INTRODUCCION A SU SISTEMATICA, VIDA Y COSTUMBRES, by Jaime Villa. Reviewed by Larry D. Wilson and John R. Meyer.

● PUBLICATION OFFICE Herpetological Information Search Systems, The American Museum of Natural History, Central Park West at 79th Street, New York, N.Y. 10024.

+ SUBSCRIPTIONS Individual members of the Society for the Study of Amphibians and Reptiles and of the Herpetologists' League will receive the new HISS publications succeeding HERPETOLOGICAL REVIEW without additional charge in 1973. These are HISS NEWS-JOURNAL and HISS TITLES & REVIEWS.
Annual subscriptions to individuals who are not members of these societies are $6 for each publication.
INSTITUTIONAL SUBSCRIPTIONS to the two new HISS publications are $12 each.
Back Issues of HERPETOLOGICAL REVIEW are available from the SSAR Treasurer at $1.50 per copy (see last page).

● ADVERTISING Advertising is restricted to goods and services pertinent to the interests of subscribers. The CLASSIFIED section is described on the last page.
COMMERCIAL ADVERTISING RATES are available from the Editor.

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EDITORIAL

The passing of an old friend is always a shock, and the passing of HERPETOLOGICAL REVIEW with this final issue is one to all of us -- in spite of our continuing much of the same work on HISS's new publications that we have done in producing HR. It was as much a surprise to us as to anyone when a subcommittee of the SSAR Board came forward at the Lake Texoma Meeting with the idea of the Society giving up its newsletter, and asking HISS to provide a substitute that would be of herpetological-community-wide scope (and more self-supporting). This was only one of several possible alternatives. The coming year will tell us if it was the proper one.

By HISS agreeing to provide SSAR (and later also the Herpetologists' League) the essential services of HERPETOLOGICAL REVIEW in 1973 with new publications at less than the costs of production, we have taken the major financial load off these societies for the year -- and assumed them ourselves. Unless, however, HISS is able to locate the needed additional income in this period, the societies will face the problem again in 1974 -- and without the funds that they withdrew from their slim reserves to assure production in 1973.

We at HISS believe that only a truly international herpetological society can provide the variety of publications and services that the herpetological community (along with its fringe members) needs and deserves. This is the reason that we were such firm supporters of the movement toward amalgamation of the SSAR and the Herpetologists' League. In spite of statements to the contrary, we still believe that the individual member would receive more and be able to contribute more to a unified, comprehensive society representing the needs of all individuals and groups who are interested in amphibians and reptiles (be they amateurs, professionals, or para-herpetologists with a major interest in ecology, embryology, or physiology). The plain fact is that there are too few professional herpetologists to carry alone the costs of their publications and services.

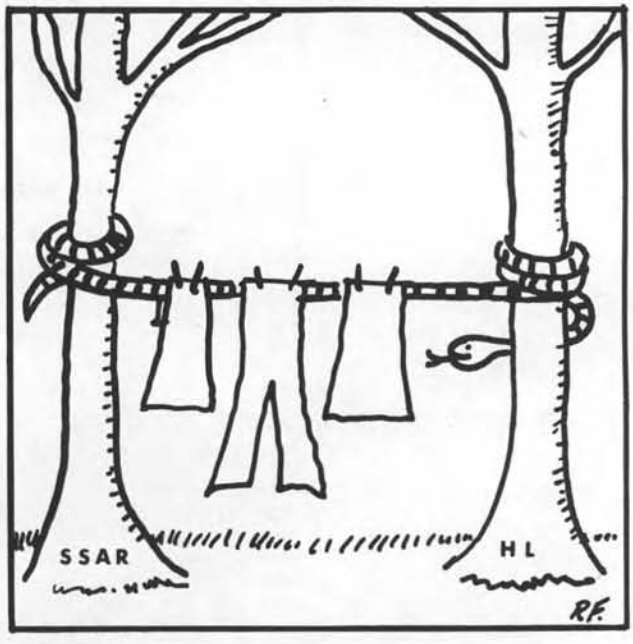
Amalgamation will not come about in 1973, anyway, so HISS will be trying to find that magic combination that will allow herpetologists to share their costs, as well as their information, with the many groups that have an interest in some aspect of the biology of amphibians and reptiles. The community-wide newsletter, the lists of current titles, and the yearbook are moves in this direction. We will need aid, ideas, and financial support for all of these. Please do not expect us to go it alone! -- HGD.

TRANSPORTATION FROM WEST COAST TO SAN JOSE, COSTA RICA FOR ASIH MEETINGS, JUNE, 1973

Charter Flight from Los Angeles direct to San Jose, Costa Rica; depart Los Angeles June 23, return July 5 -- total cost $255. Hotel accommodations $72.00 per person for week of meetings. Package includes tour of city and transfers to and from hotel. Prices subject to having maximum number of reservations to make charter possible. Send letters of inquiry by February 1, 1973 to Ms. Magnolia Small, Secretary to Jay M. Savage, Allan Hancock Foundation, University of Southern California, Los Angeles, California, 90007; (213) 746-2917 or 746-2073.

GREAT LAKES HERPETOLOGICAL SOCIETY

Mr. J. K. Langhammer (Detroit Zoo) kindly brought to our attention the error we made in HERPETOL REV 4(1): 8 in listing this society as extinct. From his letter, we understand that the GLHS is alive and well and that the report of its death is greatly exaggerated, as Mark Twain commented when another careless editor made the same mistake about him. Our apologies to GLHS, and we do hope that you will keep us informed of your activities so we may be able to print happier news about you in the future. -- IG.



CAN ANYBODY TIE A GOOD KNOT ?

MEETINGS AND SOCIETIES

CALENDAR 1972

26-31 December....AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Annual Meeting, Washington, D.C.

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting (Cosponsored by the SSAR), Washington, D.C.

CALENDAR 1973

24-30 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, San Jose, Costa Rica.

4-11 August....FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

CALENDAR 1974

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Ottawa, Canada.

The DIVISION OF VERTEBRATE MORPHOLOGY of the American Society of Zoologists will be meeting with the AAAS in Washington. Among the papers in a Symposium on Vertebrate Sound Production are the following of especial interest to herpetologists:

R. S. SCHMIDT, Central Mechanisms of Frog Calling.
W. F. MARTIN & CARL GANS, Functional Anatomy of Sound Production by Bufo.
C. GANS & P.F.A. MADERSON, Sound Production in Modern Reptiles: Review and Comments.

DUES ARE RISING EVERYWHERE

The INTERNATIONAL SOCIETY ON TOXINOLOGY has announced that 1973 dues will be $17.50.

The AMERICAN ASSOCIATION OF UNIVERSITY PROFESSORS announced increased dues that brought them to a minimum of $12 (for persons making less than $8,000) and a maximum of $36 (for those making $15,000 or more).

Active membership in the NEW YORK ACADEMY OF SCIENCES is now $35.

INDIVIDUALS AND INSTITUTIONS

JUAN R. LEON (Univ. Oriente, Venezuela) has returned to the University of Kansas to work toward his doctorate.

WILLIAM G. DEGENHARDT (Dept. Biology, Univ. New Mexico, Albuquerque, NM 87106) has received a grant of $26,000 from the National Science Foundation for a two-year study of niche expansion in Eleutherodactylus in Puerto Rico and the Virgin Islands. Graduate student KIRKLAND JONES started field work in September 1972.

Dr. EDWARD J. GREDING, Jr. (Dept. Biologia, Universidad de El Salvador) wishes to advise that he has been unable to receive mail at the University for the past month due to a military takeover and shutdown of the University and the automatic discharge of the entire faculty. If reprint requests or letters have been unanswered, please direct them to him at P.O. Box 1379, San Juan, Texas 78589. They will be forwarded from that address. This condition will extend indefinitely into the future.

MICHAEL WILLIAMSON is the new President of the New Mexico Herpetological Society.

The NEW YORK ZOOLOGICAL SOCIETY has announced the closing of SIMLA, its field station in Trinidad, and the establishment of a new CENTER FOR FIELD BIOLOGY under the leadership of GEORGE SCHALLER.

The BRITISH HERPETOLOGICAL SOCIETY has announced the appointment of a Conservation Committee, to collect information on the habits of British amphibians and reptiles "which appear to be decreasing."

ERIK H. Th. van EIJSDEN (Stephensonstratt 1, The Hague, Netherlands) would like a copy of "A revision of the African lizards of the family Gekkonidae (BULL MUS COMP ZOOL 98, 1947), by Arthur Loveridge. He is also interested in live specimens of the genus Phyllodactylus (Neotropical and Nearctic). Conditions of trade or purchase to be arranged.

HERBERT H. HARRIS, Jr. & ROBERT S. SIMMONS (Dept. Herpetology, Natur. Hist. Soc. Maryland, 2643 N Charles St., Baltimore, MD 21218) are researching the distribution and taxonomy of Crotalus and Sistrurus (particularly the Mexican forms). They would appreciate all correspondence on specimens, data, etc.

RICHARD J. BALDAUF has resigned his position at Texas A & M University to accept the new post of Curator of Education at the Kansas City Museum. He will be responsible for building new educational programs, with especial emphasis on environmental education.

REPEATED MATING OF A COPPERHEAD AND TIMBER RATTLESNAKE

Philip W. Smith & Lawrence M. Page

On July 17, 1970, a male Agkistrodon contortrix laticinctus from south Texas and Crotalus h. horridus from West Virginia, which shared the same cage, were observed mating. The Agkistrodon, which had been reared from a baby, had from time to time courted cage mates of various species. The Crotalus had also been captive several years but had been housed in a separate cage. The mating lasted approximately five hours. No young resulted.

On August 18, 1971, just 13 months later, the two snakes again mated for at least three hours. In both instances the snakes were highly excited, and the male copperhead appeared to be in some discomfort. No young resulted from the second mating.

A natural hybrid Crotalus horridus X Sistrurus catenatus from Iowa was reported by Bailey (1942). We are not aware of any intergeneric hybrids between Crotalus and Agkistrodon, nor of any other reported matings between species of these genera. In view of the two separate observations reported herein, we assume that hybridization cannot occur between a male Agkistrodon contortix and female Crotalus horridus. We are thus spared the necessity of coining the common name of "rattlehead" for the hybrid that might have resulted.

LITERATURE CITED

BAILEY, REEVE, M. 1942. An intergeneric hybrid rattlesnake. AMER NATUR 76: 376-385.

Illinois Natural History Survey
Urbana, IL 61801

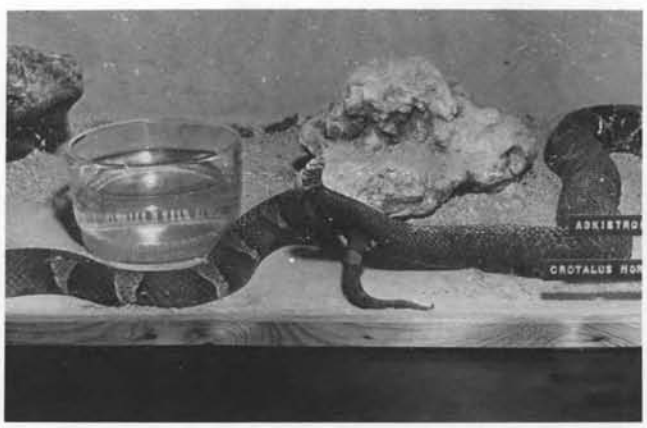


FIGURE 1. Mated Crotalus and Agkistrodon.

BIOSIS ANNOUNCEMENTS

BioSciences Information Service of Biological Abstracts (2100 Arch St., Philadelphia, PA 19103) has announced the following appointments:

PHYLLIS V. PARKINS to Executive Director of BIOSIS.

H. E. KENNEDY to Deputy Executive Director & Director for Scientific Affairs.

J. R. SMITH to Director for Research and Development.

ROBERT R. VAN GULICK to Director for Business & Finance.

BIOSIS has also reported the establishment of a cooperative systems program with CHEMICAL ABSTRACTS SERVICE which will help to eliminate duplication and allow the two services to be used in combination.

UNIV KANSAS HERPETOLOGICAL PAPERS

The Museum of Natural History, University of Kansas, Lawrence, KS 66044, is offering for sale sets of the herpetological papers published in the University of Kansas Publications, Museum of Natural History (Vols. 1-20), including several considered out-of-print.

30 sets, complete. Original except xerox of 1(6)... $50 plus $4 shipping

20 sets, original. Lacking 1(6) & 15(7)... $47.50 + $3.50 shipping

20 sets, original. Lacking 1(6), 8(3), & 15(2,7,12)... $40 + $3 shipping

Orders will be processed by the Publications Secretary on a first-come, first-served basis. Payment should accompany order.

OBITUARY

C. CLIFFORD CARL (1908-1970), author of several museum handbooks including The Amphibians of British Columbia and The Reptiles of British Columbia (both in several editions) and numerous other papers on the amphibians and reptiles of that region, died on 27 March 1970.

LEWIS H. BABBITT, long-time Massachusetts herpetologist, died at the age of 69 on 29 September 1972.

THE WASHINGTON MEETING

of the

HERPETOLOGISTS' LEAGUE

28 - 29 DECEMBER 1972

MEETING ROOM: The meetings of the Herpetologists' League will be held in the Auditorium of the Museum of History and Technology, through the assistance of Dr. James Peters and Dr. George Zug.

Note: The Executive Council of the Herpetologists' League meeting at the University of Oklahoma Biological Station in August voted to disaffiliate from AAAS. The main reason for this action was the increasing high costs assessed by the AAAS for handling meeting arrangements. We are meeting in Washington, D. C. this December because of previous commitment to this time, but have made arrangements to meet separately from the AAAS.

REGISTRATION: No registration is planned for this meeting.

HOUSING RESERVATIONS: Members planning to attend the meetings should either make their own arrangements or they may wish to place their arrangements through the facilities set up by the AAAS. The forms for such reservations are published in the fall issues of SCIENCE. It should be pointed out, however, that the hotels in which the AAAS meetings are being held are about five miles away. No one should try to alternate sessions with less than an hour's leeway. The hotels near the Museum are not of first quality, but are adequate and less expensive than the others. They are the:

EBBITT HOTEL, 1000 H Street NW. Phone 202 NA8-5034. Single with bath: $12.60.

EVERETT HOTEL, 1730 H Street NW. Phone 202 298-8464. Single with bath: $8.00.

HARRINGTON HOTEL, 11th & E Street NW. Phone 202 NA8-8140. Single with bath: $11.75 to $13.00, depending on size and location.

SEE THE ACCOMPANYING SKETCH FOR LOCATIONS.

EXECUTIVE COUNCIL MEETING: The Executive Council meeting for the Herpetologists' League will be held in the hotel room of one of the officers attending.

P R O G R A M

SYMPOSIUM

and

CONTRIBUTED PAPERS

Arranged by Charles C. Carpenter
Department of Zoology
University of Oklahoma
Norman, Oklahoma 73069

SYMPOSIUM

BIOSYSTEMATICS OF SCELOPORUS

THURSDAY, DECEMBER 28, 1972 Auditorium of the Museum of History and Technology of the Smithsonian Institution.

9:00 AM Chairman: CHARLES C. CARPENTER (Vice President, Herpetologists' League)

Comparative population genetics and the evolution of Sceloporus. WILLIAM P. HALL, III (Museum of Comparative Zoology, Harvard Univ., Cambridge, MA 02138).

A numerical approach to geographic variation in Sceloporus undulatus. JAMES R. PURDUE (Department of Zoology, Univ. of Oklahoma, and the Oklahoma Biological Survey, Norman, OK 73069).

Phylogenetic conclusions from cranial osteology and other characters in Sceloporus (Iguanidae). KEN LARSEN (Department of Zoology, Brigham Young Univ., Provo, UT 84601).

Phylogenetic considerations of display behaviors in the genus Sceloporus. CHARLES C. CARPENTER (Department of Zoology and the Stovall Museum of Science and History, Univ. of Oklahoma, Norman, OK 73069).

CONTRIBUTED PAPERS

THURSDAY, DECEMBER 28, 1972 Auditorium of the Museum of History and Technology of the Smithsonian Institution.

2:00 PM Chairman: MAX A. NICKERSON (Vertebrate Division, Milwaukee Public Museum, Milwaukee, WI 53223)

Chelonian mental glands. ROBERT M. WINOKUR and JOHN M. LEGLER (Department of Biology, Univ. of Utah, Salt Lake City, UT 84112).

Functional anatomy and evolution of burrowing in gopher tortoises. DENNIS M. BRAMBLE (Department of Biology, Univ. of Utah, Salt Lake City, UT 84112).

Effect of temperature, salinity, and photoperiod on the number of trunk vertebrae in Ambystoma maculatum. ROBERT B. PEABODY (336 Long Hall, Clemson Univ., Clemson, SC 29631).

Regional patterns of proportional variation in trunk vertebrae of Batrachoseps. SAMUEL S. SWEET (Museum of Vertebrate Zoology, 2593 Life Sciences Building, Univ. of California, Berkeley, CA 94720).

Observations on patterns of regional distribution of the salamander fauna of northern Central America. DAVID B. WAKE and JAMES F. LYNCH (Museum of Vertebrate Zoology, 2593 Life Sciences Building, Univ. of California, Berkeley, CA 94720).

An analysis of variation of scutellation in Anolis carolinensis carolinensis. RONALD K. GRATZ (Department of Zoology, Univ. of Oklahoma, Norman, OK 73069).

Microdermatoglyphics: a new tool for reptile taxonomy. HERNDON G. DOWLING, ITZCHAK GILBOA, DORIS E. GENNARO, and JOSEPH F. GENNARO, JR. (Department of Herpetology: HISS, American Museum of Natural History, New York, NY 10024).

Scanning electron micrographs of snake scales as a taxonomic tool. PATRICIA J. KIMMICH (Museum of Zoology, Louisiana State Univ., Baton Rouge, LA 70803).

Scanning electron microscopy of lizard scales. GLENN R. STEWART (Biological Sciences Department, California State Polytechnic Univ., 3801 West Temple Avenue, Pomona, CA 91766).

8:00 PM Executive Council Meeting. To be arranged.

FRIDAY, DECEMBER 29, 1972 Auditorium of the Museum of History and Technology of the Smithsonian Institution.

9:00 AM Chairman: RONALD K. GRATZ (Department of Zoology, University of Oklahoma, Norman, OK 73069).

Intensity and spectral preferences in anurans: A model of phototaxis. ROBERT G. JAEGER and JACK P. HAILMAN (Department of Zoology, Birge Hall, Univ. of Wisconsin, Madison, WI 53706).

Effect of light- and dark-adaptation on the phototactic responses of anurans to intensities and colors. JACK P. HAILMAN and ROBERT G. JAEGER (Department of Zoology, Birge Hall, Univ. of Wisconsin, Madison, WI 53706).

Telemetric study of movements and thermoregulation of the racer Coluber constrictor mormon, in northern Utah. WILLIAM S. BROWN and WILLIAM S. PARKER (Department of Biology, Univ. of Utah, Salt Lake City, UT 84112).

The role of basking in the pond turtle, Clemmys marmorata. R. BRUCE BURY (Bird and Mammal Laboratories, U. S. National Museum, Washington, DC 20560).

Growth, population size, and basking behavior of Chrysemys picta in a woodland pond. LAURENCE E. BAYLESS (Department of Biology, Concord College, Athens, WV 24712).

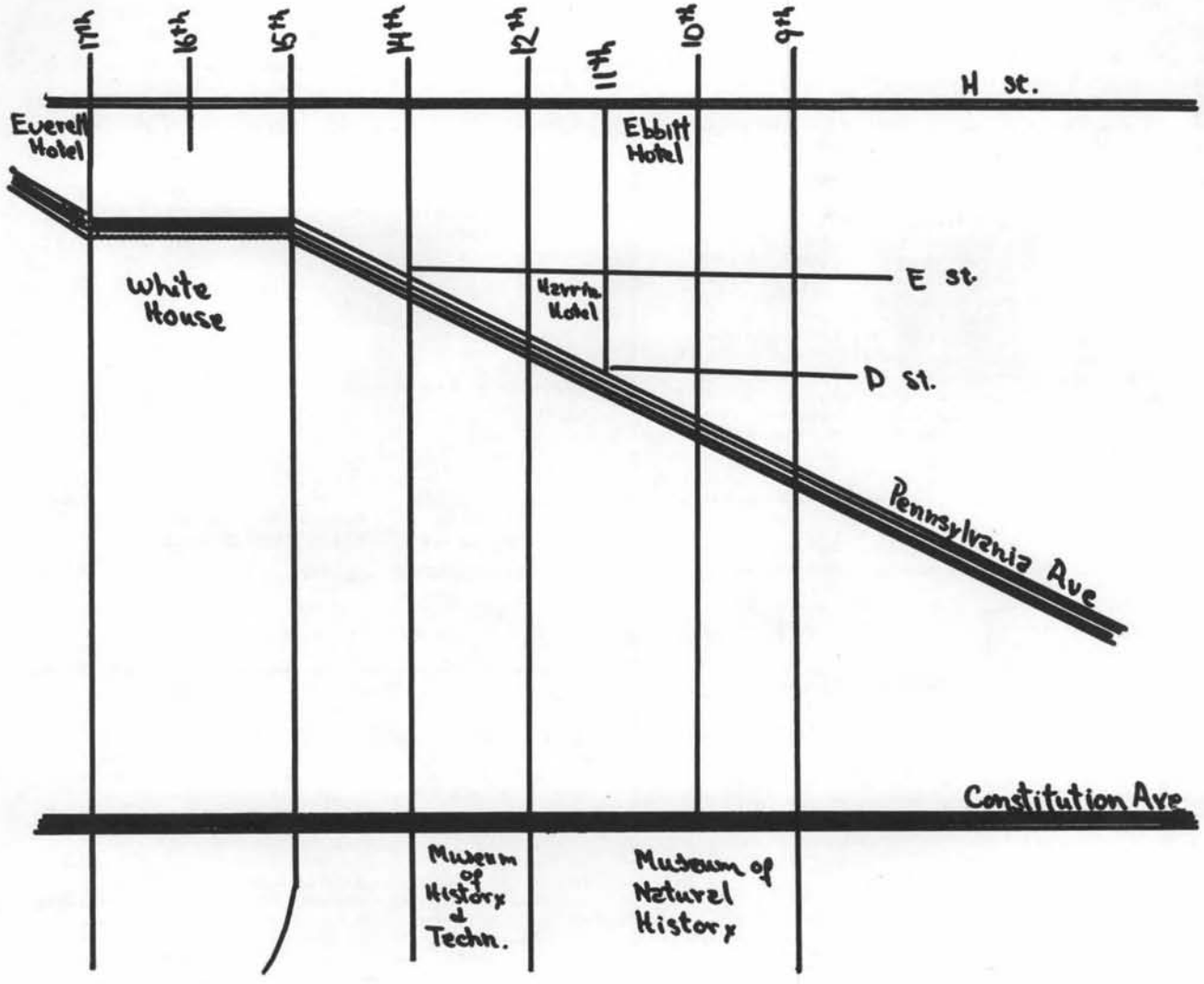
Some observations on the behavior of captive Ahaetulla prasina praeocularis. RONALD K. GRATZ (Department of Zoology, Univ. of Oklahoma, Norman, OK 73069).

Ecology of the desert horned lizard, Phrynosoma platyrhinos. WILMER W. TANNER (Department of Zoology, 575 WIDM, Brigham Young Univ., Provo, UT 84601).

An experimental study of aposematic coloration in the salamander Plethodon jordani. JOHN L. HENSEL and EDMUND D. BRODIE, JR. (336 Long Hall, Clemson Univ., Clemson, SC 29631).

11:00 AM Annual Business Meeting, Herpetologists' League. T. PAUL MASLIN, President, Herpetologists' League (Curator of Zoological Collections, University of Colorado Museum, Boulder, CO 80302).

END OF MEETING



SKETCH-MAP of the Museums area of Washington, D. C.

ABSTRACTS OF PAPERS

Bayless, Laurence E. (Concord Coll.). Growth, population size, and basking behavior of Chrysemys picta in a woodland pond.

Population parameters, growth rates, and habitat utilization for basking were studied for Chrysemys picta in a 7 acre pond near Rensselaerville, New York. Effect of capture method on results also was considered. Turtles were caught by grabbing, dip netting, and trapping, individually marked, and further studied by recapture and telescopic observation. Population size and density are lower than expected from published figures, perhaps because of a relative scarcity of shallows with emergent vegetation along the pond margins. Sex ratio is 1:1. Juvenile recruitment appears to be low and to vary greatly from year to year. Carapace length-plastron length-total weight relationships and growth rates were determined. Capture method affects sex ratios and age classes, probably because of differences in basking behavior and habitat between males, females and juveniles. Individual turtles also differ greatly in response to capture by the various methods, introducing extreme bias into some recapture rates.

BRAMBLE, DENNIS M. (Univ Utah). Functional anatomy and evolution of burrowing in gopher tortoises.

Gopher tortoises comprise two distinct phyletic lines that probably warrant generic recognition. Differences in burrowing habits account for many of the morphological features that distinguish the groups. The more conservative lineage includes Oligocene Gopherus laticunea and Recent G. agassizii and berlandieri. Members of this group have evolved a manus structurally adapted for digging in resistant soils as well as for efficient locomotion. The head is not employed in burrowing and the skull and neck vertebrae exhibit no fossorial modifications. The second lineage includes Recent G. flavomarginatus and polyphemus and fossil forms dating back to Miocene G. brevisterna. Selection in this lineage has been for the development of a manus suitable for digging in sandy, friable soils. In addition, members of the group utilize the head in digging and display related specializations of the cranium and cervical vertebrae, including a unique cervical locking mechanism. A hypertrophied inner ear and massive otolith also characterize the lineage and may be related to "head burrowing".

BROWN, WILLIAM S. and WILLIAM S. PARKER (Univ. of Utah). Telemetric study of movements and thermoregulation of the racer, Coluber constrictor mormon, in northern Utah.

Four females migrated 630, 700 and 970 m in 4-9 days from hibernacula to home ranges in spring 1971 and 1972. One individual used a nearly identical migratory path and subsequent home range both years. Mean rate of travel during migration on movement days was 151 m/day. In summer, nine females moved mean distances of 16.3 to 55.7 m between successive locations. Home range moves averaging 25 to 30 m appear typical. Mean body temperatures in four categories of location or activity were: (1) underground, 18.0 to 27.5 C (time-dependent); (2) under rocks, 25.6 C; (3) moving on surface, 33.1 C; and (4) regulating, 33.0 (AM) to 34.6 C (PM). Before solar radiation is effective, body temperatures of snakes underground slightly exceed air and surface substrate temperatures. After emergence, a period of basking is followed by relatively quiescent regulation in the sun-shade mosaic, a behavior pattern apparently unusual among some temperate lizards, but possibly more common among diurnal, heliothermic snakes.

BURY, R. BRUCE (Bureau of Sport Fisheries and Wildlife). The role of basking in the pond turtle, Clemmys marmorata.

Basking is one of the most obvious habits of freshwater turtles, yet little is known about this biological phenomenon. Studies were done on unrestrained C. marmorata to provide information on the major features of basking behavior. This species used aquatic and atmospheric basking strategies. The aquatic basking consists of "sunning" with part of the shell exposed on the surface and of selection of warm waters. The latter behavior comprises a major portion of the daily activities in C. marmorata. Observations on atmospheric basking reveal that: (1) most "sunning" occurs between 0830 and 1130 hrs; (2) sunlight triggers and terminates most basking out of water; (3) long periods of basking take place early in the day; and (4) local habitat conditions greatly influence the lenght and type of basking. Responses of turtles include changes in orientation and posture, periodic returns to the water, partly wetting the body, use of shade, and combinations thereof. Such responses serve a thermoregulatory function, and indicate that basking is an active, complex behavior in freshwater turtles.

DOWLING, GILBOA, GENNARO, & GENNARO (Amer. Mus. Natur. Hist., & N.Y. Univ.). Microdermatoglyphics: a new tool for reptile taxonomy.

Investigation of the surface structure of reptile epidermal scales by scanning-electron microscopy has shown the characters made visible by this technique to have a high degree of intraspecific similarity.

Epidermal scales of snakes of the genus Crotalus and Bothrops, as well as others, not only show unique patterns and virtual identity for members of the same species, but also have meaningful similarities at the generic level.

Thus, this preliminary survey of a few species indicates that microdermatoglyphics shows great promise of species identification from a single epidermal scale, as well as enhancing our information on reptile phylogeny.

GRATZ, RONALD K. (Univ. of Oklahoma). Some observations on the behavior of captive Ahaetulla prasina praeocularis.

ABSTRACT NOT RECEIVED.

GRATZ, RONALD K. (Univ. of Oklahoma). An analysis of variation of scutellation in Anolis carolinensis carolinensis.

ABSTRACT NOT RECEIVED.

Hailman, Jack P. and Robert G. Jaeger (Univ. of Wisconsin, Madison). Effect of Light- and Dark-adaptation on the Phototactic Responses of Anurans to Intensities and Colors.

Our previous work has shown that frogs under an intermediate state of visual adaptation seek a particular illumination: the "optimum ambient illumination" (O.A.I.), which differs among species. When the illumination is below this optimum, animals move toward "blue" stimuli, but when it is above the O.A.I. they show no true-color preference. We now report that the species' O.A.I. is shifted by the state of adaptation. Animals seek a lower illumination value during dark-adaptation and a higher value during light-adaptation. Not only is this preference for intensity shifted but the cross-over intensity between the blue-preference and the no-color-preference responses to spectral stimuli is similarly shifted. These results indicate that the phototactic preferences for intensity and colors are intimately related, probably both in terms of physiological mechanisms and the function such behavior serves under natural conditions.

JOHN L. HENSEL and EDMUND D. BRODIE, JR. (Clemson University) An Experimental Study of Aposematic Coloration in the Salamander Plethodon jordani.

Three morphs of Plethodon jordani were presented to wild avian predators. These morphs were red-cheeked, red-legged, or with no red coloration. The avian predators (Bluejays, Grackles, and Brown Thrashers) were divided into three groups of ten birds each, each group receiving a different morph. It is known that red-cheeked Plethodon jordani have a secretion that makes them distasteful to wild avian predators, while Desmognathus are not distasteful and will be readily eaten. All birds were fed one of the morphs along with Desmognathus until avoidance of the morph was achieved. Some birds never exhibited avoidance and were eliminated. Totals for the three groups were compared using the chi-square test of independence. They were compared on a survival or non-survival basis between morphs and control Desmognathus. There was a significant difference between the percentage of Plethodon jordani and Desmognathus killed or eaten for all morphs except naturally all black. Red-legged animals were avoided to a significantly greater extent than any of the other groups.

Jaeger, Robert G. and Jack P. Hailman (Univ. of Wisconsin, Madison). Intensity and Spectral Preferences in Anurans: A Model of Phototaxis.

A survey of 121 species of anurans from 16 families indicates that each species has a preference for a particular intensity of white light: the "optimum ambient illumination" (O.A.I.). Individuals experiencing illumination below the O.A.I. move so as to increase the ambient illumination while those experiencing illumination above the O.A.I. move so as to decrease the illumination. It now appears that the much-studied "blue" preference of anurans is really a function of the O.A.I. Frogs presented with spectral cues at intensities below the O.A.I. show the typical preference for the "blue" area of the spectrum, which seems to be a true color preference. However, if the intensity is raised above the O.A.I., the phototactic response resembles a U-shaped spectral threshold curve. In the latter case, high responsiveness to the ends of the visible spectrum (red and violet) and low responsiveness to blue and green appears to be a function of the spectral sensitivity of the anuran's eye and not a true spectral preference.

KIMMICH, PATRICIA J. (Ia. State Univ.) Scanning electron micrographs of snake scales as a taxonomic tool.

A preliminary examination of over 100 species representing 63 genera and 7 families indicates that scale microtopography is a useful systemic guide. Characteristics of varied topographic features enable groupings of species generally agreeing with current taxonomy. Noted discrepancies have been found, for example, in Regina, Seminatrix and Natrix.

PEABODY, ROBERT B. and EDMUND D. BRODIE, JR. (Clemson Univ.) Effect of Temperature, Salinity, and Photoperiod on the Number of Trunk Vertebrae in Ambystoma maculatum

The effect of temperature, salinity, and photoperiod on the number of trunk vertebrae in Ambystoma maculatum was studied using field collected eggs from the first through the fourth cleavage stages. Eggs were divided into groups of approximately three hundred and maintained from the stage at collection until after hatching under controlled conditions. Groups were maintained (1) at temperatures of 5, 10, 15, 20, and 25°C using field collected larvae as controls; (2) at salinities of 0.3% and 0.6% using 0.15% as a control; and (3) at photoperiods of 11 and 14 hours of light per day using 12 hours of light per day as a control. Vertebral counts made on 502 cleared and stained animals resulted in a range of 14 to 16 with a mode of 15 trunk vertebrae. Results indicate a significant positive correlation of vertebral number with increased salinity, negative correlation of vertebral number with increased temperature, and no significant correlation of vertebral number with photoperiod. The dependence of vertebral number on each of the three treatments (temperature, salinity, and photoperiod) was tested by a Chi square test of independence at the 0.01 significance level.

STEWART, GLENN R. (California State Polytechnic Univ.). Scanning electron microscopy of lizard scales.

ABSTRACT NOT RECEIVED.

SWEET, SAMUEL S. (Univ. Calif. Berkeley). Regional patterns of proportional variation in trunk vertebrae of Batrachoseps.

The elongate salamanders of the genus Batrachoseps show absolute and relative changes in vertebra length and breadth regionally along the column. These features vary through ontogeny and among species. Ontogenetic changes include relative length increase, transverse process extension, and enhancement of regional trends with increasing age. Species differ in the number of presacral vertebrae, proportions in the neck and sacral regions, and degree of paedomorphic influence. B. aridus has an elongate atlas, and mid-trunk vertebrae of B. wrighti are considerably longer than other species. B. relictus, attenuatus and major are characterized by increasing paedomorphic influence and numbers of trunk vertebrae. B. pacificus, simatus and stebbinsi resemble one another and can be separated from the members of the relictus species group. Trends in the genus include proportional changes associated with the transition from a standing wave towards a travelling wave form of locomotion, and the evolution of a flexible neck in these tongue feeding plethodontids.

TANNER, WILMER W. (Brigham Young Univ.). Ecology of the desert horned lizard, Phrynosoma platyrhinos.

ABSTRACT NOT RECEIVED.

WAKE, DAVID B. and JAMES F. LYNCH (University of California, Berkeley...)

Observations on patterns of regional distribution of the salamander fauna of northern Central America.

The area between the Isthmus of Tehuantepec and the lowlands of Nicaragua is a major center of salamander diversification. Salamanders occur from sea level to nearly 4000 meters, with the greatest diversity in cloud forests between 1000 and 2500 meters. Highland species are structural and ecological generalists, with broad distribution. Their relatives occur to the north of the Isthmus of Tehuantepec. Intermediate elevations are characterized by endemic species with restricted distributions. These species form groups characterized by allopatry, with close relatives usually being found in immediately adjacent regions. The highly specialized lowland species have broad ranges and low densities. They have both southern and northern relatives. Specific examples are chosen to illustrate the above generalizations as well as faunal distributional patterns on the Guatemalan Plateau, the Sierra Madre of coastal Chiapas and Guatemala, the Pacific volcanic chain, and the major mountain masses of inland Chiapas and Guatemala (supported by NSF grant GB 17112).

WINOKUR, ROBERT M. AND JOHN M. LEGLER (Univ. of Utah). Chelonian mental glands

Mental glands are paired integumentary holicrine glands located between the mandibular rami. They occur in the Testudinidae and both subfamilies of the Emydidae. All genera but one of the Emydidae (Batagur) and two of the Testudinidae (Pyxis and Acinixys) have been examined. Mental glands were found in all but five genera of the subfamily Batagurinae but in only two genera (Clemmys and Dierochelys) of the subfamily Emydinae. Mental glands are placed in three categories on the basis of histology as follows: Class I -- multilobed and occurring only in Gopherus; Class II -- non-lobed, distinctly glandular, and occurring in various batagurines; Class III -- paired, deep invaginations of the mental skin, lacking distinctly glandular cells and occurring in the Emydinae and some batagurines. Class III glands may be inactive stages or vestiges of Class II glands. It is known that the secretions of mental glands in Gopherus elicit combat behavior in males. The function of mental glands in the Emydidae is unknown; data on sexual and seasonal variation are incomplete and inconclusive.

AN UNUSUAL SPECIMEN OF *AMEIVA UNDULATA* (SAURIA: TEIIDAE) FROM YUCATAN, MEXICO

Jeremy E. Penner

Naturally occurring abnormalities of the limbs and digits are rare in lizards, although fairly common in frogs. Syndactyly (Munyer, 1963) and polydactyly (Loewen, 1941) have been reported for *Sceloporus undulatus*, although in searching through the literature, no other examples of limb or digit abnormalities in lizards were found.

On February 2, 1969, I collected a juvenile specimen of *Ameiva undulata* approximately 2 km E of Progreso, Yucatan, Mexico. The specimen was unique in that the distal portions of both pairs of limbs were lacking. When discovered, the lizard attempted escape with wriggling motions of the body, the useless limbs being brought against the substrate, but its forward progress on the loose sandy soil was meager compared to the amount of energy expended. The animal was preserved, and subsequent stomach content analysis revealed no food. The difficulty in locomotion and the lack of food indicated a genotype of low selective value.

Embryonic experiments indicate that the ectodermal apical ridge of the limb bud in the chick is essential for the development of the distal portion of the limb (Balinsky, 1960). If the formation of the apical ridge is inhibited, the distal portion of the limb cannot form, although the girdle develops normally, and a short piece of cartilage representing the humerus or femur may develop. In this specimen (U.S. Nat. Mus. 194614), the genotype may have resulted in the suppression of apical ridge formation on all limb buds.



FIGURE 1. Specimen of *Ameiva undulata* without distal limb elements.

The author would like to express his appreciation to George Zug for his aid in reviewing the manuscript.

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THE LAST OF ITS KIND ?

This photograph of a lone male Abingdon Tortoise (*Geochelone elephantopus abingdonii* Guenther) on its native island in the Galapagos (Isla Pinta = Abingdon) may be prophetic. This individual, found and photographed by Peter C.H. Pritchard in the Spring of 1972, is the only known representative of this form living.

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NESTING SITES, EGGS AND YOUNG OF *HEMIDACTYLUS MABOUIA* FROM CARRIACOU, WEST INDIES

George B. Pendlebury

Carriacou, located 210 km southeast of Barbados, is the largest of the Grenadine Islands. The house gecko *Hemidactylus mabouia* (Moreau de Jonnes), introduced into South America and the West Indies from Africa, has established itself on Carriacou and is a relatively common member of the island's herpetofauna.

The nocturnal lizards normally lay their eggs in natural situations such as rock crevices and hollows in trees. However, when these creatures take up residence in human habitations and their environs, artificial nesting sites are commonly utilized.

On June 27, 1967 the writer found a clutch of two eggs in a hole left where a piece of mortar had fallen from a stone wall. The same day, a young boy from the town of Windward brought me three eggs which he found in a hole in the wall of his house. While these occurrences are not extraordinary, less orthodox nesting sites were found in a house 0.7 km south-southwest of Windward.

On July 4, 1967 I found eight eggs in a latch of the kitchen door, (Fig. 1). The empty shells and the random orientation of the openings suggests that these eggs hatched, and were not broken as a result of the door's frequent use. Eleven days later, I found six eggs in the space behind some books in a bookcase. One of these eggs hatched the following day. The remainder were sacrificed and found to be in different stages of development. This, plus the fact that geckos generally lay no more than a pair of eggs, indicates that a number of these lizards were making concurrent use of the same nesting sites. These observations support the findings of Pienaar (1966) who reported that particularly favorable spots are used as communal depositories by *H. mabouia* in Africa.

Spec. No.	Date of Capture	Length (mm) Snout-vent	Total
GBP-C- 4	July 16, 1967	21	40
GBP-C- 9	July 2, 1967	22	42
GBP-C-10	July 5, 1967	25	51
GBP-C-22	July 31, 1967	23	44
GBP-C-23	August 2, 1967	23	41

Table 1. Measurements of young *Hemidactylus mabouia* from Carriacou, West Indies.

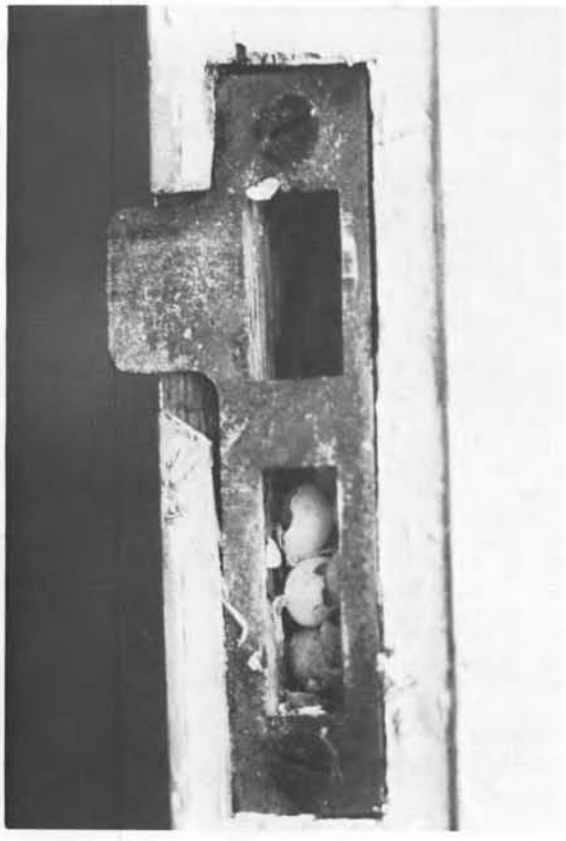


FIGURE 1. Communal nesting site of *Hemidactylus mabouia* in a door latch.

The writer used a binocular microscope with a micrometer eye-piece to measure a total of seven eggs from three different Carriacouan clutches. The long axes of the eggs ranged in length from 9.3 to 9.8 mm, x = 9.6 mm. The short axes were from 7.9 to 8.4 mm in length, x = 8.1 mm. Loveridge (1953) reported that the eggs of African *H. mabouia* ranged in size from 10 to 13 mm. Pienaar (1966) gave the size range as 10 to 12 mm.

A newly hatched *H. mabouia*, (GBP-C-4), from Carriacou had a snout-vent length of 21 mm and a total length of 40 mm. This is notably longer than newly hatched African specimens which measure 30 to 32 mm in total length (Pienaar, 1966). Data on four other juveniles of unknown age from Carriacou are presented in Table 1 for comparison.

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REPORT ON THE SSAR-HL LAKE TEXOMA MEETING

The SSAR held its fifteenth annual meeting with the HERPETOLOGISTS' LEAGUE at the University of Oklahoma Biological Station at Lake Texoma on 13-17 August 1972. Cordial hosts, excellent facilities and a relaxed atmosphere made this well-attended meeting highly successful.

The Board of Directors met Sunday 13 August with Chairman C. J. McCoy presiding. Present for the Board meeting were Kraig K. Adler, Arden H. Brame, Jr., Herndon G. Dowling, Robert E. Gordon, J. P. Kennedy, Sherman Minton, Max A. Nickerson, Henri C. Seibert, James Vial, and George R. Zug. The Board moved to: (1) give Dr. Kennedy the okay to expand the JOURNAL OF HERPETOLOGY to four issues in 1973, (2) retire HERPETOLOGICAL REVIEW as a title and purchase from HISS six issues of a newsletter and four issues of Current Titles annually and (3) approve four conservation proposals. Reports from various SSAR committees were heard and budgetary items were discussed.

On Monday there was a meeting of the Committee on Joint Cooperation. The paper session began 8:30 AM Tuesday with Chairman McCoy calling the meeting to order. Welcoming addresses were made by Dr. Paul F. Sharp, President, University of Oklahoma, Dr. Loren G. Hill, Director, University of Oklahoma Biological Station, and Dr. Victor H. Hutchison, Chairman of the Zoology Department, University of Oklahoma. Paper sessions continued through Tuesday and Wednesday with Drs. Robert G. Webb, Albert P. Blair, M. J. Fouquette and James R. Dixon presiding over the sessions. A panel discussion on the "future of herpetology" preceded the business meeting on Wednesday. The members of the Joint Committee on Cooperation served as panelists.

Additional events included an art and photographic exhibit organized by Rick Purdue and a live display of amphibians and reptiles (especially Oklahoma species) arranged by Robert Ball and Jim Archie. Dr. Carpenter led a field trip to local sites of herpetological interest on Thursday.

Scheduled social events included a smoker Tuesday evening and a banquet Wednesday evening. At the latter Joseph T. Collins was presented an award for his many years of service to the society.

The SSAR thanks the University of Oklahoma, the Oklahoma Zoo, the local committee (Drs. Victor Hutchison, Charles Carpenter and Hobart Landreth), local committee assistants and Dr. Loren Hill and his staff for their many contributions which led to the success of this meeting.

Max A. Nickerson
Secretary

SSAR RESOLUTION NUMBER 1. SUPPORTING THE NATURE PROTECTION ACT AND THE ENDANGERED SPECIES ACT OF 1972

WHEREAS, enactment of a Nature Protection Act will protect endangered or rare species and subspecies of fish and wildlife from commercial exploitation and needless killing in the United States and its territories; and

WHEREAS, the Endangered Species Conservation Act of 1972 will extend such protection to species and subspecies that are "likely within the foreseeable future to become threatened with extinction;" and

WHEREAS, the Society for the Study of Amphibians and Reptiles is an organization whose members are dedicated to the scientific study and conservation of amphibians and reptiles, and to the dissemination of knowledge about them; now, therefore

BE IT RESOLVED, that the Members of the Society for the Study of Amphibians and Reptiles meeting at Lake Texoma, Oklahoma, August 14, 1972, declare their full support for, and urge the passage of, the Nature Protection Act and the Endangered Species Conservation Act of 1972.

[SSAR Resolution Number 2 is essentially the same as ASIH Resolution No. 3, which was published in HERPETOL REV 4(4): 137. It is not repeated here.]

SSAR RESOLUTION NUMBER 3. FOR THE PROTECTION OF NORTH AMERICAN TORTOISES (Gopherus)

WHEREAS, the four species of the genus Gopherus (G. agassizi, G. berlandieri, G. flavomarginatus, G. polyphemus) are confined to the southern parts of the United States and northern Mexico, and are the only native North American tortoises; and

WHEREAS, the desert tortoise (G. agassizi) is protected by law in Arizona, California and Nevada; Berlandier's tortoise (G. berlandieri) is protected by law in Texas; and the State of Mississippi requires a special permit for non-resident persons to take gopher tortoises (G. polyphemus); and

WHEREAS, the Director, Departmento de Conservacion de la Fauna Silvestre, Mexico, reported to the Conservation Committee of the American Society of Ichthyologists and Herpetologists that according to the federal hunting laws of Mexico the collecting of tortoises in Mexico is unlawful without special authorization, which is seldom granted, and that authorities in northern Mexico have been notified so that they may

take more effective surveillance methods to check the exportation and sale of illegally taken tortoises; and

WHEREAS, the International Union for the Conservation of Nature and Natural Resources recognizes the desert tortoise (G. agassizi), Berlandieri's tortoise (G. berlandieri) and bolson tortoise (G. flavomarginatus) to be rare, endangered or depleted forms; and

WHEREAS, North American tortoises generally are unsuitable as pets since they seldom live long outside of their native habitat and usually slowly starve to death in captivity due to diets lacking in proper minerals and vitamins; and

WHEREAS, the transfer of one species of Gopherus into the region of another, and with subsequent release into the wild, may lead to the decimation of native populations due to detrimental effects of competition for food and living space, hybrid sterility if interbreeding occurs, and introduction of new diseases and parasites; and

WHEREAS, there is a substantial and often illegal commercial business in the importation and sale of North American tortoises in the United States, and many of these animals die during transportation and storage by animal dealers; and

WHEREAS, there is a continuing depletion of these unique North American tortoises due to habitat destruction, needless killing, mortality on roads, collecting for pets, trading, and commercial exploitations; now, therefore,

BE IT RESOLVED, that the Society for the Study of Amphibians and Reptiles meeting at Lake Texoma, Oklahoma, August 14, 1972, urges the Secretary of the Interior of the United States and the Director of the Departmento de Conservacion de la Fauna Silvestre of Mexico to prohibit the importation or exportation of any species of North American tortoises (genus Gopherus) into or out of their countries, except for legitimate scientific, educational, and zoological display purposes; and

BE IT FURTHER RESOLVED, that this Society urges the Directors or Commissions of State Wildlife Departments and Agencies to undertake measures to insure the survival of native populations of North American tortoises, and to outlaw the sale, harming, collecting, and possession of any North American tortoise within their state boundaries, except for legitimate scientific, educational, and zoological display purposes; and

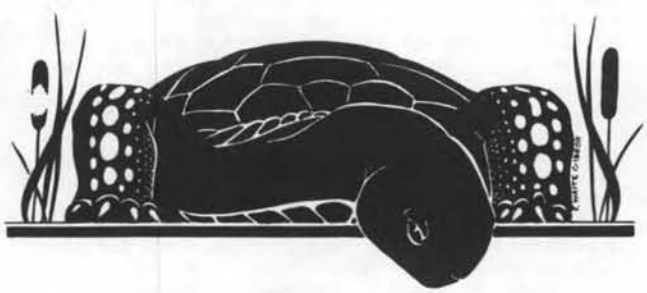
BE IT FURTHER RESOLVED, that copies of this resolution be sent to the Secretary of the Interior, the Director of the United States Fish and Wildlife Service, the Chief of the Office of Endangered Species, Directors and Commissions of State Wildlife Departments and Agencies, and the Director of the Departmento de Conservacion de la Fauna Silvestre, Mexico.

SSAR RESOLUTION NUMBER 4. THE IMPORTATION OF EXOTIC SPECIES

WHEREAS, certain species of amphibians and reptiles are capable of inflicting serious injury upon domestic animals and human beings; and

WHEREAS, the Society for the Study of Amphibians and Reptiles is an organization dedicated to the scientific study and conservation of amphibians and reptiles, and to the dissemination of knowledge about them; now, therefore,

BE IT RESOLVED, that the Society for the Study of Amphibians and Reptiles meeting at Lake Texoma, Oklahoma, August 14, 1972, urges the concerned agencies of the Federal Government and the fifty states to develop regulations prohibiting, except for legitimate scientific, educational, or zoological display purposes, the importation of amphibians and reptiles.



POSTDOCTORAL POSITION IN ANIMAL ORIENTATION

A postdoctoral position to study light receptors and mechanisms for orientation in amphibians and reptiles will be available for a 12-month period beginning September 1973. Current studies include the role of polarized light in orientation and the identification of extraoptic receptors, but candidates should provide a prospectus of their own research plans. Other details may be obtained from Dr. Kraig Adler, Section of Neurobiology and Behavior, Cornell University, Langmuir Laboratory, Ithaca, New York 14850.

AN IMPORTANT REPORT TO SSAR MEMBERS

As early as 1970 it was recognized by some officers of both organizations that the converging memberships, activities, and objectives of the Society for the Study of Amphibians and Reptiles (SSAR) and the Herpetologists' League (HL) were resulting in duplication of effort. The SSAR Board of Directors, at their 1970 meeting in Kansas City, decided to consider "closer cooperation, coordination, and possible amalgamation" with HL. At the 1970 AAAS meeting in Chicago a joint session of the SSAR Board and the HL Council was held. At this session the two organizations agreed to co-sponsor the annual meetings in 1971, and to hold a joint annual meeting in 1972. They also agreed to joint sponsorship of Herpetological Review. At this same meeting the two societies appointed members to a "Joint Committee on Cooperation," which was charged to consider the long-range objectives of cooperation between the societies, including the feasibility of amalgamation into one organization.

The Joint Committee on Cooperation held meetings at Albuquerque and Philadelphia during 1971, and circulated proposals, counter-proposals, memos, and reports. At the 1972 meeting at Lake Texoma the Joint Committee held its final meetings, and prepared a report based on the deliberations and investigations of the previous twenty months. This report was adopted unanimously by the members of the Joint Committee, and accepted by the SSAR Board of Directors and the HL Executive Council.

The Joint Committee reported that amalgamation of the two societies into one is not feasible at the present time, but that economic conditions may eventually force reconsideration of the feasibility of amalgamation. The Joint Committee further recommended that the two organizations continue to pool efforts and cooperate in various areas, and that this cooperation should be directed by joint meetings of the governing bodies of the two societies.

The role of the Joint Committee, and its area of responsibility, have been widely misinterpreted by the members of both HL and SSAR. The Joint Committee was charged to study the objectives of long-range cooperation between the organizations. Although amalgamation certainly could be one means of consolidating our efforts, it is not the only means. Nevertheless, many members of SSAR had the idea that the Joint Committee was formed only to develop detailed plans for amalgamation. The Joint Committee report clearly approves and suggests increased cooperation and elimination of wasteful duplication, but without amalgamation at this time.

One of the most disappointing aspects of the Joint Committee's work was the lack of input from members of the societies. Repeated pleas for suggestions and opinions brought only a few letters, mostly from members with very strong feelings about the single question of amalgamation. This letter is another request for your help. The Board of Directors has accepted the report of the Joint Committee, but we must be responsive to the desires of the membership at large in implementing the recommendations of the committee. I ask you to consider carefully the three alternatives facing SSAR, as outlined below. Make your own judgement, and please respond by marking and returning the attached sheet. Your response will determine the future of our society.

Sincerely,

C. J. McCoy, Chairman

The Alternatives

(1) Separation. The societies would remain separate entities, with separate governing bodies, but with no formal provision for exchange, communication, or cooperation. This arrangement provides maximum freedom for independent development, but risks maximum inefficiency and duplication of effort.

(2) Amalgamation. Complete merger of the organizations would produce a single society with enlarged membership (not double either HL or SSAR). Diversity of approach and potential for divergent development would be halved, but planning and objectives could be unified. The cost of membership would not be reduced, since both organizations now maximize services by extensive reliance on contributed services of officers ("hidden costs"). Membership dues translate directly into services (publications, etc.), and a reduction in dues could be achieved only by reduction of services. Contributed services might be more difficult to obtain with the increased work-load in a larger organization, thus "hidden costs" could become real costs, but some population-dependent costs (such as printing) might be reduced. Duplication in governing bodies would be eliminated, but the chance for an individual to serve a society would be reduced. Competition in publications would be avoided, but diversity of editorial approach would suffer. Organizational problems could be reduced, but flexibility and responsiveness might be sacrificed.

(3) Cooperation. Each organization would retain independence and potential for divergent development, but some (not all) duplication of effort could be eliminated. The organizations could cooperate on matters of mutual interest (public affairs, meetings, etc.), but remain responsive to their own memberships. Members could be given a united voice in matters of general interest, but still could serve the single organization whose philosophy best suited their personal objectives. Population-dependent costs would not be reduced, but contributed services could be maximized. Diversity of publications and editorial policy could be preserved.

An Analysis

The following comparison of the possible benefits of the three alternatives was developed during the Joint Committee deliberations. It does not represent a consensus of the Joint Committee members, nor of the Board of Directors of SSAR, but it may be useful to you in evaluating the alternatives.

	(1)Separation	(2)Amalgamation	(3)Cooperation
Organization			
1. maximizes opportunity for contribution of services	best	least	next best
2. eliminates duplication	least	best	next best
3. permits unified approach to herpetological problems	least	best	next best
4. permits greater concensus for action	best	least	next best
5. maximizes efficiency	least	best	next best
6. permits individual initiative to promote specific program	best	least	next best
7. opportunity for individual participation	best	least	next best
8. maximizes flexibility in policy	best	least	next best
9. promotes diversity	best	least	next best
Individuals			
1. choice of programs greater	best	least	next best
2. has greater say in societal operations	best	least	next best
3. maximum choice of meeting to attend	best	least	next best
4. voice in national matters is enhanced	least	best	next best
5. opinion on given issue is enhanced	best	least	next best
6. convenience in dealing with professional societies is enhanced	least	best	least
7. benefits from economic competition	best	least	next best

A POLL OF S S A R MEMBERS

(See overleaf)

	(1)Separation	(2)Amalgamation	(3)Cooperation
Economic			
1. population-dependent costs are best served	least	best	next best
2. stability best attained	least	best	next best
3. pooled assets maximized	least	best	n. a.
4. competition eliminated	least	best	next best
5. cost of meetings factor	least	best	next best
6. ability to provide multitude of services while maximizing hidden cost is served	next best	least	best
Publications			
1. will permit diversity of policy in journal	best	least	next best
2. greater economy of production	least	best	n. a.
3. maximize institutional subscriptions, distribution, etc.	least	best	n. a.
4. will permit diversity of type of publication	best	least	n. a.
5. maximum efficiency of operations (mailing lists, billing, etc.)	least	best	n. a.
6. will reach quality levels	least	best	n. a.

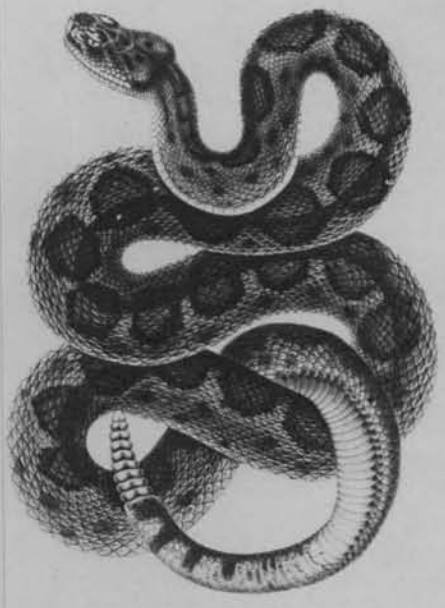
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As a member of SSAR, I favor the following alternative in future relations with the Herpetologists' League (check one):

(1) Separation (2) Amalgamation (3) Cooperation

_____
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Check here ( ) if you are also a member of the Herpetologists' League.



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AUSTRALIAN ANURAN CHROMOSOME NUMBERS

David S. Woodruff

Following on the first description of an Australian anuran's karyotype (Robinson and Stephenson 1967) I determined the chromosome numbers of six other leptodactylids and a hylid from Victoria. Chromosome numbers were determined from colchicine-arrested squash preparations of larval tail-tips.

The leptodactylids (Limnodynastes tasmaniensis, Crinia signifera, C. victoriana, Pseudophryne bibroni, P. dendyi, P. semimarmorata) were found to have 12 pairs of chromosomes in the normal diploid set. Results for L. tasmaniensis, C. signifera, and P. bibroni confirm the findings of Ullerich (1967) and Moreschalchi et al. (1968). Chromosome complements have now been reported for 10 Australian leptodactylids, representing four of the 17 genera present in this region. 2N = 24 in all species studied and there are six pairs of large and six pairs of small, meta- or submetacentric, chromosomes. Despite overall similarity in chromosome numbers and morphology, detailed studies have revealed interspecific morphological variation, at least in Limnodynastes (Robinson and Stephenson 1967, Ullerich 1967). In contrast to the situation in Australia, none of the 72 Neotropical or African leptodactylids examined have a diploid number of 24 (Lynch 1971).

The hylid, Litoria ewingi, was found to have 13 pairs of chromosomes in the normal diploid set. Karyotypes of six other species of Litoria are known (Duellman 1967, Stephenson and Stephenson 1970). 2N = 26 in all but one Papuan species (L. angiana 2N = 30). Chromosome numbers of 36 other species of Hyla from Holarctic and Neotropic regions are summarized by Stephenson and Stephenson (1970): all but five species have a diploid number of 24. Thus, Tyler's (1971) resurrection of Litoria for the Australo-Papuan hylids previously referred to Hyla, is supported by the data on chromosome numbers.

This study was supported by an Australian Commonwealth Postgraduate Award. I thank Guy Bush and William Hall for technical advice and discussion.

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The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and more than 1000 through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, etc. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. A complete list of the journals covered by us is published in Herpetol. Yearb. 1971. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1971-1972) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be more current than the previous quarterly issues allowed.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 1 August 1972 through 30 September 1972. HR is computer printed and because of necessary production procedures there is a possibility that on occasion the titles from a single issue of a journal may appear in several issues of HR. Periodical title abbreviations follow the International List of Periodical Title Word Abbreviations (based on the Amer. Nat. Standards Comm. Z39.) (Chemical Abstracts Service, Columbus, Ohio, US.).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and M. Coxe. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

This is contribution Number 46 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

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BOOK REVIEW

ANFIBIOS DE NICARAGUA: INTRODUCCION A SU SISTEMATICA, VIDA Y COSTUMBRES. By Jaime Villa, 1972. Instituto Geografico Nacional y Banco Central de Nicaragua, Managua, Nicaragua. xii + 218 pp., 139 figs. (Available from Ralph Curtis Books, 2633 Adams Street, Hollywood, Florida 33020). $4.00.

The "darkest" portions of the Central American isthmus, with respect to the herpetofauna, lie in its approximate geographic center, viz., Nicaragua and Honduras. Nonetheless, much of zoogeographically important Nuclear Central America was comprised of what is now Nicaragua and Honduras. There are several reasons for this regrettable situation, but one important factor has been the lack, until recently, of workers committed to the study of the herpetofauna of these countries. The herpetofaunas of Guatemala, British Honduras, El Salvador, and Costa Rica have been treated in major works. Although a major work has yet to be published in Panama, there has been much more written on the herpetofauna of that country than for either Honduras or Nicaragua.

It is extremely heartening, therefore, to note the emergence of Villa's Anfibios de Nicaragua, the first of a series of works treating the lower vertebrates of this country. It is equally heartening to note that this is the first major herpetofaunal work on any country in Central America to be authored by a native of that country.

Anfibios de Nicaragua is intended by the author as a dual purpose book, first as a general introduction to the biology of Central American amphibians and secondly as a study of the Nicaraguan amphibians.

The book is divided into two major sections, an introduction treating various general aspects of the biology of Central American amphibians and accounts of the caecilians, salamanders, and anurans of Nicaragua. The introductory section contains information generally available elsewhere, but not in Spanish and not in a format likely to be easily obtainable in Nicaragua and other Central American schools. Thus this section should prove useful in biology courses in Central America.

Our interest, as students of the herpetofauna of the neighboring country of Honduras, is primarily in how well the second purpose has been fulfilled. Each of the 54 species currently known from Nicaragua is treated in varying detail. Spot distribution maps are provided for only 30 of those species, although Villa stated that only species with country-wide distributions were not mapped. This can hardly apply to the centrolenids and the Eleutherodactylus, none of which had their distributions mapped. A wide range in presentation of distributional data is evident, varying from species with no map or statement of Nicaraguan distribution (e.g., Centrolenella pulverata) to those with a spot map and a listing of specific Nicaraguan localities (e.g., Leptodactylus pentadactylus). In our opinion, inclusion of specific Nicaraguan localities for all species would have been valuable.

Perhaps this was deleted in the interest of shortening the book, but we feel that some information contained in the species accounts could have been deleted because it is available in published form elsewhere, so that room could have been made for locality records. For example, a long discussion of the confused taxonomic history of Rana maculata (=R. macroglossa auctorum) and the lists of recently published synonyms for some species (e.g., Eleutherodactylus bransfordi, Phrynohyas vendulosa, Smilisca baudinii) are out of place in this kind of work. Additional space would also have been gained by the deletion of published descriptions of individuals of certain species (e.g., all Centrolenella). This information could have been presented in a shortened fashion consistent with that given for other species.

A useful addition to the work would have been a gazetteer of herpetological localities in this little-known country. Another major contribution would have been a section dealing with the vegetation or ecological zones of that country, as reference was frequently made to these zones in distributional statements and this information is difficult to find elsewhere.

A final point of criticism relates to the lack of order of presentation of data in the species accounts. Villa stated in his introduction that he felt that varying the order would improve readability, but in terms of both readability and usability we feel that a standardized approach would have been more appropriate.

On the balance, we are happy to see this discussion of the known amphibian fauna of Nicaragua, along with the keys for identification and the generally good illustrations, and we are looking forward to the appearance of the other works in this series.

LARRY DAVID WILSON
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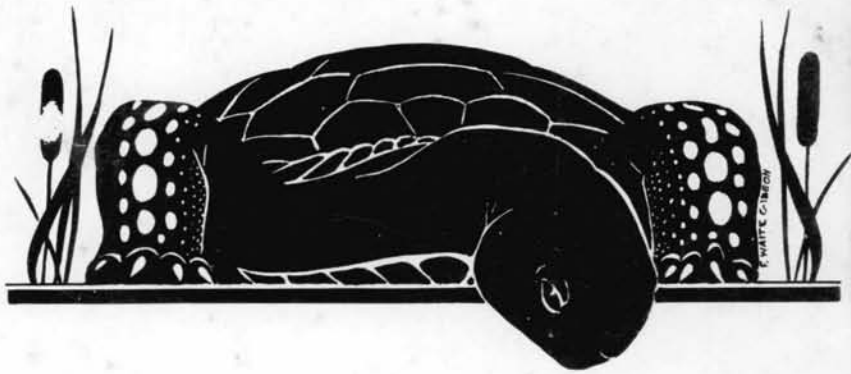
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IMPORTANT NOTICE
TO SSAR MEMBERS
ON PAGE 206

ANNUAL MEETING
HERPETOLOGISTS' LEAGUE
WASHINGTON, D.C.
28 - 29 December 1972



herpetological REVIEW

THE NEWSLETTER ON AMPHIBIANS AND REPTILES...
AND THE PEOPLE WHO STUDY THEM

VOLUME 4, NUMBER 5

OCTOBER 1972

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The Society was founded in 1958 as the OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information of these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communication between amateur and professional workers. (See Third Cover for membership information.)

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Produced for the

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and the

HERPETOLOGISTS' LEAGUE

by

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In 1971 it had 900 members and fellows (including Life and Honorary members), and more than 400 institutional subscriptions to its journal, HERPETOLOGICA, which has been published continuously since 1936.

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Herpetological Review

VOLUME 4, NUMBER 5

OCTOBER 1972

-- N E W S A N D A N N O U N C E M E N T S --

158 EDITORIAL: HISS's new role.
CALENDAR & NOTICES.

159 FINAL REPORT OF THE HL - SSAR JOINT COMMITTEE ON COOPERATION.
166 HERPETOLOGY AT INDIANA UNIVERSITY.
168 A NEW BIBLIOGRAPHY OF TURTLE BEHAVIOR.

-- D E P A R T M E N T S --

REPORTS

165 Grass sprout grows through embryo of Yellow-bellied turtle (Chrysemys scripta), by Frank J. Turkowski.
167 Variations in the form of the trigeminal foramen in snakes, by Frances W. Gibson.
169 An unusual specimen of Thamnophis marcianus from Veracruz, Mexico, by Douglas A. Rossman.

GEOGRAPHIC VARIATION

170 NEW RECORDS of Ambystoma maculatum, Hemidactylium scutatum, Eurycea longicauda, Graptemys pseudogeographica, Chrysemys scripta, Hemidactylus turcicus, Ficimia cana, Lampropeltis triangulum, Micrurus fulvius, Rhadinaea flavilata, and Trimorphodon biscutatus.
172 A new record of the desert striped whipsnake Masticophis taeniatus taeniatus from the Providence Mountains Region of San Bernardino County, California, by Timothy W. Brown.
172 Introductions into Hawaii.

173 CONSERVATION: A plea for conservation, by Harold A. Dundee.

174 CURRENT HERPETOLOGICAL TITLES, XXII.

-- S O C I E T Y N O T E S --

160 Herpetologists' League Council Meeting.
SSAR Chairman's Report.
161 SSAR Lake Texoma Business Meeting.
164 HERPETOLOGICA Reviewers.
Members' Desiderata
Keown wants Texas distribution data
New wants to sell HERPETOLOGICA copies.
166 SSAR Contributors.

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H I S S GIVEN MAJOR ROLE BY HERPETOLOGICAL SOCIETIES

Among the various activities of the Lake Texoma meeting -- administrative, social, and scientific -- were two key decisions that changed the status of HISS, perhaps for all time.

1. The Board of the SSAR decided to discontinue publication of HERPETOLOGICAL REVIEW, in favor of a newsletter for the entire herpetological community which is to be published by HISS. At the same time it voted sufficient funds to HISS to assure that SSAR members would receive the same services from HISS publications that they have from HERPETOLOGICAL REVIEW.
2. Subsequent to the SSAR action, the Council of the Herpetologists' League voted equivalent funds to HISS, to provide its members with these services.

In a sense, then, HISS has been given the ball and told to run with it. The $11,400 voted by the two societies make up only a minor part of HISS's current budget. And, with both societies digging into their reserves to provide even this minimum amount, it is obviously only a one-year solution for them. Neither society can support both its own journal plus the newsletter and current titles from current income.

However, with this strong indication of support from the herpetological community, HISS's chances of obtaining other funds are considerably improved. We are making an all-out effort to find full support for HISS services in 1973 and beyond. We must depend on society members to aid us in this search.

In addition to its present issues of PUBLICATIONS IN HERPETOLOGY and the HERPETOLOGISTS' YEARBOOK, HISS will issue two new publications to satisfy these new society demands:

HISS: NEWS will continue and expand on the news and information format that we have developed in HERPETOLOGICAL REVIEW over the last several years. This newsletter will continue to appear bimonthly.

HISS: TITLES will expand the literature alerting service of "Current Herpetological Titles" by a new section on "New Titles in Herpetological Journals" and an expanded section on new books and reviews. Four or five "Titles" issues are planned, depending on the volume of current literature.

We wish to emphasize that individual members of SSAR and H L will receive BOTH publications of this expanded service (ten or more issues) at no additional cost in 1973. However, we must count on new institutional subscriptions to make up a major part of the difference between the amount received from the two societies and the actual costs of production.

THEREFORE, WE URGE EVERY MEMBER TO ASK HIS INSTITUTION NOW TO SUBSCRIBE TO THE VARIOUS H I S S PUBLICATIONS. -- HGD.

(N.B. Information on subscriptions will be found on page 174; on SSAR and H L decisions, p. 160.)

CALENDAR 1972

22-26 November...III Congreso Nacional de Biologia & Symposium de Biologia Tropical Amazonica, Iquitos, Peru.

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting (Cosponsored by the SSAR), Washington, D.C.

CALENDAR 1973

24-30 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, San Jose, Costa Rica.

4-11 August....FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

SUPPORT FOR H I S S GREATLY APPRECIATED

HISS has received a large number of letters supporting its activities, and some checks to aid its deficit budget during the current year. Persons, referring to our various notices, have indicated that they are willing to spend from $5 to $25 additional in the coming year, to continue to receive "Current Herpetological Titles."

The actions of the two herpetological societies (p. 160) have meant that SSAR and H L members will NOT have to pay extra for this service in 1973. Subsequent years are still in doubt, however, and will be determined to a considerable degree by how successful HISS is in selling its products to other individuals and institutions. Institutions (other than NSF) so far have contributed little to HISS's budget. We are asking, therefore, that all our supporters help us in gaining this essential support by recommending institutional subscriptions to our publications (p. 174).

Our utmost gratitude for the support that you have already given. -- HGD.

FINAL REPORT
JOINT COMMITTEE ON COOPERATION
HERPETOLOGISTS' LEAGUE AND SOCIETY FOR THE
STUDY OF AMPHIBIANS AND REPTILES

At the joint meeting of the two societies at Lake Texoma on 16 August 1972 the following recommendations were submitted to the governing bodies:

1. Merger is not practical at present.

2. However, in the opinion of the committee, if the two societies continue as separate entities financial exigencies may appear, in one or both societies, which will force reconsideration of this posture.

3. Therefore, we recommend that joint cooperative actions might continue.

4. The committee offers for consideration the following:
   a. A joint annual meeting.
   b. Joint meeting(s) of administrative committees.
   c. Establishment of joint committees to facilitate concerted action and to optimize society resources (money and time) in such areas as conservation, publication, cooperation with regional societies, information services, etc. Specifically, we recommend that the two governing bodies of the societies arrange to meet jointly at annual meetings.

5. Finally, the committee recognizes that the governing body of each society must act on this report individually, but we strongly urge that a joint session of the two bodies be called upon at the earliest opportunity to consider the above recommendations.

Representing the SSAR	Representing the HL
ROBERT E. GORDON	WILMER W. TANNER
KRAIG ADLER	HOBART F. LANDRETH
HERNDON G. DOWLING	CLARENCE J. McCOY
HENRI C. SEIBERT	VICTOR H. HUTCHISON,

N.B. Item #6 in the report of the SSAR Business Meeting (p. 162) is pertinent to this report.

"Of the 791 members of the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES and the 885 members of the HERPETOLOGISTS' LEAGUE, 484 are held in common.

Thus, 61 per cent of SSAR members belong to the H L, and 55 per cent of H L members belong to the SSAR." [From a paper given at the Lake Texoma meeting by I. Gilboa & H. G. Dowling.]



NOW WHICH WAY ?

INTERIM MEETING OF THE EXECUTIVE COUNCIL THE HERPETOLOGISTS' LEAGUE

Nine of the thirteen members of the Executive Council of the Herpetologists' League attended the meetings at Lake Texoma. Inasmuch as this constituted a quorum it was possible to meet and take action on several important issues.

The Society for the Study of Amphibians and Reptiles has relinquished its control of HERPETOLOGICAL REVIEW to Herpetological Information Search Systems in order to allow HISS greater control in promoting this newsletter. It has agreed to increase its support of this organ for another year. The Herpetologists' League also has contributed funds for the support of this newsletter and your Council voted to continue this support, matching funds that the SSAR will contribute, for one additional year. The funds for this support will not come from our current budget, but will be drawn from our Reserve fund.

The editor of HERPETOLOGICA, Ronald Altig, has resigned; but we were fortunate in finding a well-qualified replacement, Dr. Crawford G. Jackson, Jr., from a nearby sister institution, Mississippi State College, at Columbus. The Council voted to accept Jackson's offer to take over the editorial duties. It expressed regret for Altig's resignation, and appreciation for his fine work in editing HERPETOLOGICA.

Dr. Hobart F. Landreth, your Secretary-Treasurer also has submitted his resignation which, with regret, the Council accepted. The names of several fine candidates are available and a selection will be made shortly of a man to replace him.

The American Association for the Advancement of Science, with whom we have been affiliated for many years, has decided that it can no longer subsidize the costs of the annual meetings of specialized affiliated societies. Rather than raising registration fees it decided to charge for room rental, projectionists, page costs in the program, etc. These charges are excessive. The American Society of Zoologists and the Society for the Study of Evolution also are involved and have decided to meet separately after this year. They have asked us to join them at Houston, Texas, in 1973. The League Council and the Board of Directors of the SSAR are forming a joint Meetings Planning Committee who will consider this invitation. In the meantime we will meet in Washington on December 28-29 as originally planned, but not with the AAAS.

T. P. Maslin, President

SSAR CHAIRMAN'S REPORT

During the past four years you have received the society newsletter, HERPETOLOGICAL REVIEW including a bibliographic insert CURRENT TITLES. Both HERPETOLOGICAL REVIEW and CURRENT TITLES have been produced for the society by HISS, an NSF-funded herpetological information service based at the American Museum of Natural History. SSAR, with help from the Herpetologists' League, has been paying for production of HERPETOLOGICAL REVIEW and the printing of CURRENT TITLES, but the cost of preparing CURRENT TITLES has been contributed by HISS and supported by NSF grant funds.

Early in 1971 we learned that the NSF support that has given us CURRENT TITLES at minimal cost would not continue beyond 1972. We have also been aware that the society could not pay for the preparation of CURRENT TITLES without a substantial increase in membership dues and subscription rates. Despite this difficult situation, the SSAR Board of Directors has acted to maintain these valuable services to the members of the society through 1973.

Starting in January the production of a herpetological community newsletter will be taken over entirely by HISS. This new publication will provide essentially the same services as HERPETOLOGICAL REVIEW, but it will not be an official publication of SSAR. Members of the society will receive six issues of this newsletter in 1973, along with four issues of CURRENT TITLES. In order to purchase these services for SSAR members through 1973 the board has authorized expenditures from the society's cash reserve.

The board had two primary motives in making this unusual decision. First, we are anxious to maintain the innovative and useful services to members that have made SSAR strong. Second, the board wanted to offer HISS the greatest possible chance for survival. The freedom offered HISS under this arrangement should make it easier for the project to broaden its base of support and to develop new sources of revenue to replace NSF funding.

Obviously it will be impossible to continue this arrangement beyond 1973, so I ask the members of SSAR to follow the lead of the board in offering every possible means of support for the irreplaceable HISS project at this crucial time in its history.

C. J. McCoy, Chairman



SSAR - BUSINESS MEETING

University of Oklahoma Biological Station
Lake Texoma, Oklahoma
16 August 1972

Dr. C. J. McCoy (Chairman) called the meeting to order at 5:35 P.M.

1. Report from the SSAR Board of Directors meeting.

   A. Three issues of the Journal of Herpetology will be issued in 1972 and Dr. Kennedy was given the okay to expand it to four issues in 1973.

   B. Two large facsimiles will appear in 1972:

      (1) Dunn: Salamanders of the Family Plethodontidae (In Press)
      (2) Fitzinger: Systema Reptilium (near submission)

      In 1973 the Bulletin of the American Antivenin Institute will be offered as a large facsimile.

   C. Two additional small facsimiles will appear in 1972:

      (1) Boulenger: Part 15
      (2) Boulenger: Part 16

   D. The SSAR-Board decided to retire HERPETOLOGICAL REVIEW as a title and to purchase from HISS six issues of a newsletter and four issues of Current Titles annually.

2. Two bylaw items proposed in Albuquerque and not considered at Philadelphia were presented for discussion:

   A. To provide visibility and appropriate representation for the Editor of the Catalogue of American Amphibians and Reptiles, it is proposed that:

      Article II, Section 4, item d shall become Article II, Section 4, item e, and...a new item d shall be inserted to read: The Editor of the Catalogue of American Amphibians and Reptiles shall be responsible for all phases of the publication of the Catalogue. He may appoint staff members to assist him. He shall report annually to the Board to whom he is responsible.

   B. To permit the Secretary more time for election preparation etc., it is proposed that:

      Article IX, Section 4 be changed as follows: "within one month" shall be changed to "within three months."

      Motion #1

      Dr. Duellman moved and Dr. Minton seconded a motion to accept the Board of Directors report. Passed.

3. The Nominating Committee reported the slate of Candidates for 1973.

   A. Dr. Henri Seibert (Treasurer) and Dr. Max A. Nickerson (Secretary) were presented unopposed.

   B. Candidates for Chairman-Elect are:

      Dr. James R. Dixon
      Dr. George Zug

   C. For the Board of Directors:

      (1) Slate 1
          Mr. Ray Pawley
          Mr. Mal Skaroff

      (2) Slate 2
          Dr. William Pyburn
          Dr. Philip Smith
          Dr. John Wright

   D. Nominations from the floor were accepted and Dr. Adler moved that Mr. John Applegarth be added to Slate 1. This was seconded by Dr. Nickerson. Passed.

      Dr. Seibert moved that nominations be closed. Dr. Duellman seconded and the motion passed.

4. Four conservation resolutions from the Conservation Committee were presented.

These (1) indicated the Society's support of the Nature Protection Act and the Endangered Species Conservation Act of 1972; (2) affirmed the professional responsibility of herpetologists; (3) supported the protection of North American tortoises (Gopherus); and (4) opposed the wholesale importation of amphibians and reptiles.

Resolution #2 is essentially the same as the ASIH Resolution #3, which was published in HERPETOL REV 4(4): 137. The text of the other resolutions will appear in the Conservation Section in this or future issues.

It was moved by Dr. Bury and seconded by Dr. Christensen that these resolutions be accepted. Passed.

5. Dr. Nickerson delivered the following statement of gratitude:

The SSAR wishes to thank the University of Oklahoma, its President - Dr. Paul Sharp, the Host Committee - Dr. Victor Hutchison, Dr. Charles Carpenter and Dr. Hobart Landreth, the University of Oklahoma Biological Station, its Director - Dr. Loren Hill, his wife and staff, for providing the excellent facilities and organization enjoyed at this meeting. We commend the Committee Assistants: Alice Echelle, Diane Tucker, Paula Brooks, Gina Meneguzzi, Anthony Echelle, Robert Ball, Mike Christensen, Rich Purdue, Gus Engbretson, Peggy Engbretson, Mary Jo Engbretson, Jim Archie, Dale Tuttle, Gordon Henly, Ronald Gratz and Douglas Turney for a job well done. Their efficient and courteous manner contributed greatly to the success of all events. Our appreciation is extended to the Oklahoma City Zoological Park for supplying staff and transportation and to HISS for conducting a call for papers and providing abstracts. SSAR expresses its great gratitude for the highly creative and energetic efforts of our Past-Chairman - Dr. Robert Gordon and Retiring Directors - Dr. Sherman Minton and Dr. George Zug.

6. Dr. Duellman moved that the Board of Directors of SSAR propose to the Executive Council of Herpetologists League that the SSAR and HL merge into one society. The results of this proposal are to be made available as soon as possible and no later than the next annual meeting. The motion was seconded by Dr. Rossman. Passed 53 for - 20 against.

7. Dr. Maslin moved that the title of HERPETOLOGICAL REVIEW be released by SSAR and given to HISS. The motion was seconded by Mr. Larson. Passed.

The meeting was adjourned.

Respectfully submitted,
Max A. Nickerson
SSAR - Secretary

Snakes Alive

NEW YORK POST, THURSDAY, APRIL 13, 1972

ATLANTA (AP)—There are snakes all over the place at Claudine Jackson's home in southwest Atlanta.

She's found them in the grass, under bricks and discarded lumber and tin cans and in a concrete culvert—90 of them last week and 37 in the first three days this week.

"I've found three in my house," she said. "I don't put on my shoes in the morning without shaking them out first.

"I don't go into the back yard without a hoe."

Mrs. Jackson called Director Charlie Fleming of the State Museum, and in a 20-minute visit he caught 17—one garter snake, one gopher snake, one king snake and one hog snake. The rest were ground snakes. None was poisonous.

Fleming had no explanation for the abundance of snakes.

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FOR THE HERPETOLOGIST

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BACK ISSUES OF HERPETOLOGICAL REVIEW

The SSAR Publications Secretary is pleased to announce that all back issues of HERPETOLOGICAL REVIEW are now available at the usual cost of $1.50 each.

MEETING

EASTERN SEABOARD HERPETOLOGICAL LEAGUE

TAKOMA PARK, MARYLAND

SUNDAY, 29 OCTOBER 1972 All Interested Are Invited!

12.30 - 1.15 PM - REGISTRATION, setting up of exhibits, program line-up: Entrance of Columbia Union College SCIENCE BUILDING (No. 6 on map). Lunch (all vegetarian) available at CUC Snack Shop in CAMPUS CENTER (No. 1 on map).

1.15 - 3.15 PM - FIRST SESSION in Science Amphitheater in SCIENCE BUILDING.

Introductory remarks by Dr. Lester E. Harris, Jr., Head, Department of Biology, Columbia Union College

Keynote lecture by Dr. R. Bruce Bury, Chief, Herpetology Section, Bird and Mammal Laboratories, Bureau of Sport Fisheries, United States Department of the Interior

Various guest speakers and regional society representatives

3.15 - 4.00 PM - BREAK for examination of exhibits

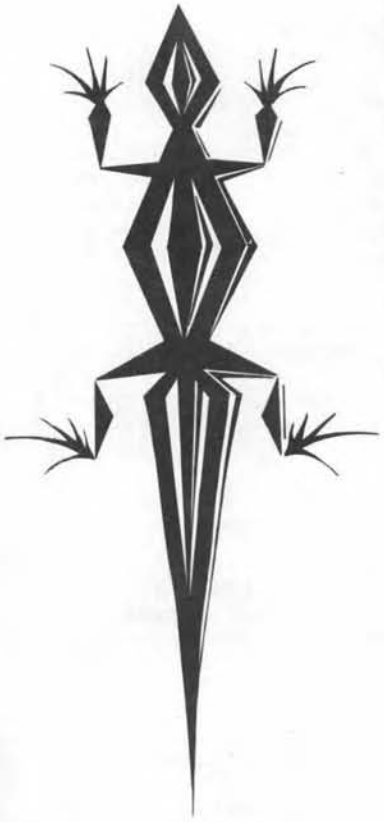
4.15 - 5.45 PM - SECOND SESSION in Science Amphitheater in SCIENCE BUILDING.

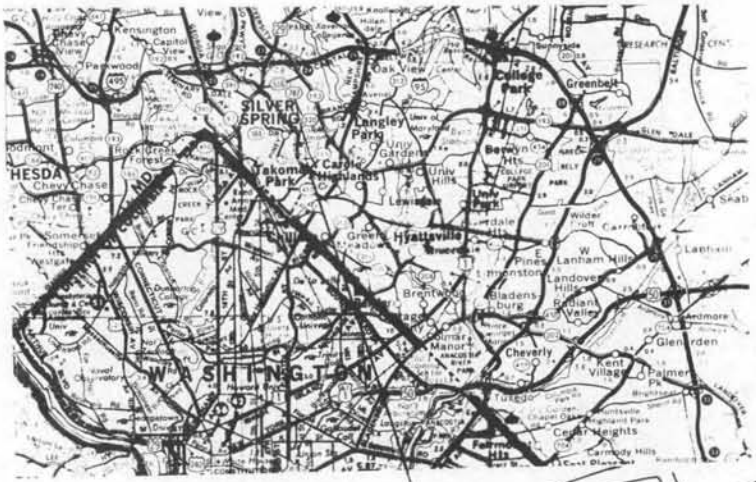
Various speakers from regional groups

(4.15 - 5.45 PM - Meeting of ESHL organizational representatives in Library of SCIENCE BUILDING to enact business)

6.00 PM - Adjourn for DINNER at Cafeteria (all vegetarian) in CAMPUS CENTER (Flat rate of $1.50 per person, no limit on servings)

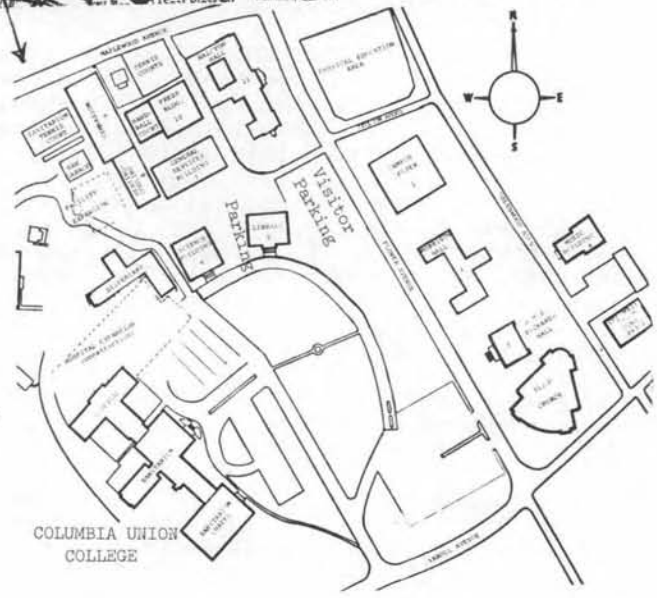
(Cages, aquaria, etc., will be provided for housing live herps - NO POISONOUS SNAKES OR LIZARDS, please! Columbia Union College will provide 16mm and slide /"Carrousel"/ projectors. No smoking in buildings, please.)





DIRECTIONS TO COLUMBIA UNION COLLEGE [refer to Washington, DC, area road map]

Take Exit 25 South (New Hampshire Avenue) from Capital Beltway (I-495) to MD Route 410 (East-West Highway) at Takoma Park. Turn right onto East-West Highway. Cross County line into Montgomery County from Prince Georges County and proceed to traffic light. Carroll Avenue intersects East-West Highway obliquely from the right at this point. Turn right and continue on Carroll Avenue. The Washington Sanitarium, which is indicated on most area road maps, will be on the left shortly before Carroll Avenue intersects Flower Avenue. A major landmark at the intersection is the large, domed church. Turn left. There will be plenty of visitors' parking across street from Campus Center building.



For information, contact Bob Tuck, Coördinator, ESHL, 5431 - 56th Ave., #3, Riverdale, MD 20840 [301-927-7171], or Margaret Thomas, Secretary, ESHL, 1611 - 31st Street, N.W., #104, Washington, DC 20007 [202-338-7389].

HERPETOLOGICA REVIEWERS

The Editor and Editorial Board of Herpetologica gratefully acknowledge the assistance of the following people who have assisted in the review of manuscripts for Volume 28; possible deletions are accidental and these people are thanked anonymously in advance!

Kraig Adler, Univ. of Notre Dame; Ronald Alvarado, Oregon State Univ.; James D. Anderson, Rutgers Univ.; Kenneth K. Asplund, Virginia Commonwealth Univ.; Walter Auffenberg, Florida State Museum; Ralph Axtell, Southern Illinois Univ., Edwardsville; Richard J. Baldauf, Texas A&M Univ.; Georga A. Bartholomew, Jr., Univ. of California, Los Angeles; J. D. Batson, Georgia College; Jeffrey H. Black, Univ. of Oklahoma; J. Sherman Bleakney, Acadia Univ.; James P. Bogart, Louisiana Tech Univ.; Ronald A. Brandon, Southern Illinois Univ., Carbondale; Jeffrey L. Briggs, Univ. Wisconsin, Whitewater; Edmund D. Brodie, Jr., Clemson Univ.; Richard C. Bruce, Western Carolina Univ.; Gordon M. Burghardt, Univ. of Tennessee; James L. Christiansen, Drake Univ.; Donald R. Clark, Jr., Texas A&M Univ.; C. J. Cole, American Museum of Natural History; Roger Conant, Philadelphia Zoological Gardens; William G. Degenhardt, Univ. of New Mexico; Michael W. Dix, Univ. of Georgia; James R. Dixon, Texas A&M Univ.; James L. Doble, Auburn Univ.; James W. Dole, California State Univ.; Neil Douglas, Northeastern Louisiana State College; Arthur C. Echternacht, Boston Univ.; Gary D. Ferguson, Kansas State Univ.; Henry Fitch, Univ. of Kansas; M. J. Fouquette, Jr., Arizona State Univ.; Howard L. Freeman, Susquehanna Univ.; Anne Funkhouser, Univ. of the Pacific; Fred G. Gaffney, North Texas State Univ.; Frederick R. Gehlbach, Baylor Univ.; A. L. Gennaro, Eastern New Mexico Univ.; J. W. Gibbons, Savannah River Ecology Laboratory; Coleman J. Goin, Univ. of Florida; Stephen R. Goldberg, Whittier College; Donald E. Goodman, Florida State Museum; Phillip C. Goodyear, Oak Ridge National Laboratory; Robert R. Gorman, Colorado State Univ.; Kenneth Gosner, Newark Museum; Robert Gray, Lake Erie College; Sheldon I. Guttman, Miami Univ.; L. M. Hardy, Univ. of New Mexico; Julian Harrison, College of Charleston; Harold F. Hirth, Univ. of Utah; James E. Huheey, Univ. of Maryland; R. R. Humphrey, Indiana Univ.; Donald Hunsaker, San Diego State College; Robert F. Inger, Field Museum of Natural History; Crawford Jackson, Mississippi State College for Women; Thomas Jensen, Virginia Polytechnic Institution and State Univ.; Oliver W. Johnson, Northern Arizona Univ.; Edward D. Keiser, Univ. of Southwestern Louisiana; J. P. Kennedy, Univ. Texas Dental Branch; Julian S. Kenny, Univ. of the West Indies; W. C. Kerfoot, Univ. of Michigan; John M. Legler, Univ. of Utah; Paul Licht, Univ. of California, Berkeley; Robert L. Livezey, Sacramento State College; Jasper J. Loftus-Hills, Univ. of Texas; John D. Lynch, Univ. of Nebraska; Paul F. A. Maderson, Brooklyn College; Jan Martan, Southern Illinois Univ., Carbondale; Wilbur W. Mayhew, Univ. of California, Riverside; C. J. McCoy, Carnegie Museum; James P. McKeown, Millsaps College; Malcolm R. Miller, Univ. of California School of Medicine; William W. Milstead, Univ. of Texas, Austin; Sherman A. Minton, Indiana Univ. Medical Center; Edward O. Moll, Eastern Illinois Univ.; Richard R. Montanucci, Univ. of Kansas; N. Mrosovsky, Univ. of Toronto; Craig Nelson, Indiana Univ.; Ronald A. Nussbaum, Oregon State Univ.; Gary C. Packard, Colorado State Univ.; William Palmer, North Carolina State Museum of Natural History; Eric R. Pianka, Univ. of Texas, Austin; Jack Pierce, Austin College; Peter Pritchard, Univ. of Florida; W. F. Pyburn, Univ. of Texas, Arlington; H. W. Reno, Baylor Univ.; D. A. Rossman, Louisiana State Univ.; Stanley N. Salthe, Brooklyn College; Jay M. Savage, Univ. Southern California; Robert C. Shoop, Univ. of Rhode Island; Sidney B. Simpson, Jr., Northwestern Univ.; A. C. Skorepa, Univ. of Tennessee; Hobart M. Smith, Univ. of Colorado; Phillip W. Smith, Illinois State Natural History Survey; David H. Snyder, Austin Peay State Univ.; Gregory K. Snyder, Univ. of Florida; Glenn R. Stewart, California State Polytechnic College, Pomona; Margaret Stewart, State Univ. of New York, Albany; Wilmer W. Tanner, Brigham Young Univ.; Douglas H. Taylor, Miami Univ.; Sam R. Telford, Univ. of Florida; Frederick H. Test, Univ. of Michigan; Robert A. Thomas, Texas A&M Univ.; Gordon Thurow, Western Illinois Univ.; Stephen Tilley, Smith College; Frederick B. Turner, Univ. of California, Los Angeles; E. P. Volpe, Tulane Univ.; J. Martin Walker, Univ. of Arkansas; G. C. Weary, Macdonald College; Robert G. Webb, Univ. of Texas, El Paso; C. H. Wharton, Georgia State Univ.; W. G. Whitford, New Mexico State Univ.; John Wright, Los Angeles County Museum; Richard G. Zweifel, American Museum of Natural History.

MEMBERS' DESIDERATA

GERALD KEOWN (P.O. Box 267, Alice, Texas 78331) is working on a study of the geographic distribution of Texas reptiles and would like to have any available county checklists from this area, as well as any other distribution data on a county by county basis. He is also interested in purchasing, for the cost of duplication, 35 mm. color slides of North American reptiles.

JOHN G. NEW (Dept. Biology, State University College, Oneonta, N.Y. 13820) for sale: Herpetologica Vols 1-28 (1-25 bound) $210 plus postage.

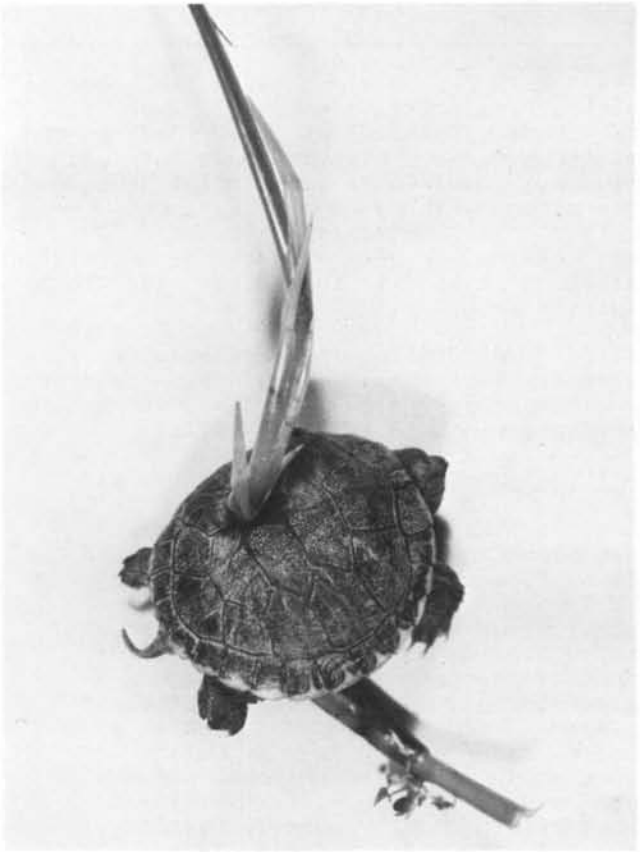
GRASS SPROUT GROWS THROUGH EMBRYO OF YELLOW-BELLIED TURTLE (*Chrysemys scripta*

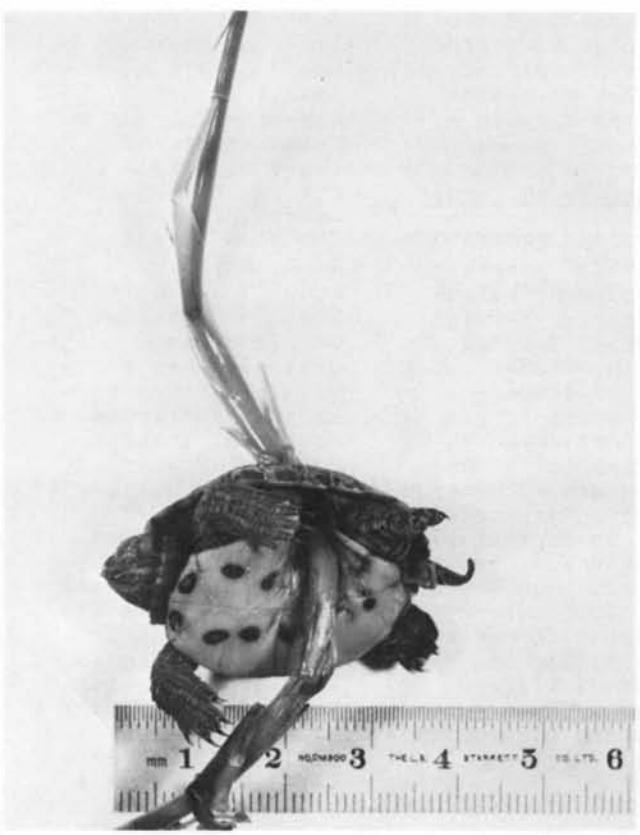
Frank J. Turkowski

On 18 September 1947 a yellow-bellied turtle (*Chrysemys scripta*) nest was uncovered by a plow near Long Island, Back Bay Refuge, Virginia. A sprout of beardgrass (*Andropogon* sp.) had grown through the plastron of one developing turtle and emerged through the carapace. Though other external features appeared normal, shields were deformed where the grass had entered ventrally between the left abdominal and femoral scutes and emerged between the junction of the left third vertebral and second and third costals. The nest was disturbed greatly but apparently the specimen had hatched as there were no adhering egg remains. To my knowledge this is the first deformity reported due to direct contact of vegetation on a yellow-bellied turtle embryo.

I am grateful to Ross K. Watkins for the photographs and to Carl Simmons for providing the specimen which is in the Arizona State University Herpetological Museum.

Dept. of Zool.
ARIZONA STATE UNIVERSITY
Tempe, AZ 85281





SSAR CONTRIBUTORS

The SSAR is always happy to receive contributions from its members. Over $2000 have been donated by contributing and sustaining members over the past two years, including some rather substantial donations whose donors wish to remain anonymous. More important than the money, however, is the warm feeling of approval of the Society's activities that is indicated by these voluntary acts.

Since we failed to acknowledge this generosity last year, we now take pleasure in indicating with an * those who contributed both in 1971 and 1972.

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HERPETOLOGY AT INDIANA UNIVERSITY

Work with amphibians and reptiles at Indiana University involves both field studies of ecology and evolution and laboratory analyses of development. Professor Craig E. Nelson serves as advisor for the field studies. His current work includes studies of the systematics of New World Microhylidae, of hybridization as an indicator of interspecific affinities in Ambystoma, and of the relationships between niche breadth, phylogenetic distance and genetic variability in the anuran community at the Boreceia field station of the University of Sao Paulo. Genetic variability analyses for the later project are being done by Dr. Sheldon I. Guttman of the Miami University of Ohio. Dr. Michael Ewert, a guest investigator, is studying "r" and "k" selection as reflected in geographic differences in turtle reproductive strategies.

Dr. J. Michael Jones has completed a study of evolutionary changes in the Bufo woodhousei and B. americanus populations near Bloomington which have occurred since A. P. Blair studied them in 1940. Dr. Jones has accepted a position with Emory and Henry College in Emory, Virginia. Mrs. Bonnie Walters completed a master's thesis on predatory interactions among pond breeding amphibians and is now living in San Luis Obispo, California.

Mr. P. Kelly Williams is concluding a study of the movements and population dynamics of 4 Ambystoma species which develop in the same pond. Mr. Michael Sabath has completed a study of some ecological aspects of gecko populations on Guam and is now devoting his efforts to a study of community structure in drosophid flies. Mr. Peter Hartz is currently pursuing studies on hybridization and isolating mechanisms in both naturally occurring and artificially produced sympatric areas between species of Hypopachus in Guatemala.

Indiana University maintains an axolotl colony (Ambystoma mexicanum) for experimental work in genetics and development. At present year-round spawning is being obtained. There are 32 mutants in stock. Professor R. R. Humphry is in charge of the axolotl colony and is continuing his work on mutant phenotypes and linkage. Mrs. Janice Brothers is Director of the axolotl colony and is responsible for colony maintenance. Professor John Sinclair continues work on DNA-RNA hybridization. Professors Robert Briggs and George Malacinski are investigating the molecular aspects of developmental mutants in the axolotl.

VARIATIONS IN THE FORM OF THE TRIGEMINAL FORAMEN IN SNAKES

Frances Waite Gibson

In snakes the maxillary and mandibular branches of the fifth cranial nerve, (V-2 and V-3), emerge from the prootic through the trigeminal foramen. The opening is separated by a bridge of bone into anterior and posterior foramina. This was long considered a constant feature.

In his general remarks on the anatomy of Serpents, Cope (1900: 689) stated "The trigeminus foramen is represented by two, which communicate beneath a long bridge in all snakes,...." Romer (1956: 128) made a similar statement. Neither Lakjer (1926) nor Hoffstetter (1939) mention any exception to this condition. McDowell (1967: 689) described the double trigeminal foramina as characteristic of alethinophidian (booid and colubroid) skulls and does not indicate any deviation from this pattern within this group. He further described the single foramen as typical of the scolecophidian skull (Typhlopidae, Leptotyphlopidae, and Anomalepidae). Underwood (1967: 1) used the double trigeminal foramina as a universal characteristic of snakes with the exception of Typhlops. Further (p. 101) in his generic description of Heterodon, Underwood stated: "The maxillary and mandibular branches of nerve V emerge through a common foramen, a very unusual condition" (see Fig. 1).

During recent studies several cases of variations in the form of the trigeminal foramen came to light. One of these was a Heterodon platyrhinos (AMNH 62590) skull which has a partial partition of the trigeminal foramen on the right side and a complete separation into anterior and posterior foramina on the left (Fig. 2). In eleven other specimens of Heterodon, however, all trigeminal foramina were single. Specimens examined were: five H. platyrhinos (AMNH 63590, 69647, 73805, 45035, and 106282); five H. nasicus (AMNH 58234, 74842, 87289, 87290, and a specimen with no data); and two H. simus (AMNH 99054 and 8343).

Other variations in the foramen within a genus occur in Trimeresurus, Bothrops and Xenodon. The foramen is usually double in Trimeresurus. However, skulls of T. albolabris (AMNH 27946) and T. wagleri (AMNH 4950) each exhibit the single condition on both sides. The foramen is usually divided in Bothrops, also, but B. atrox (AMNH 52937) has only partial separations on both sides. In Xenodon, two specimens (X. severus, AMNH 76573 and 62576) have single foramina while two specimens (X. merremi, AMNH 78970 and 35996) have double foramina.

A characteristic, by definition, is a distinguishing feature by which a group can be differentiated. In order to do this, it must be present in all members of that group. The variations of the trigeminal foramen point to an instability which makes it of doubtful value as a generic characteristic. Obviously, the double foramen cannot serve as a distinguishing feature of the Ophidia.

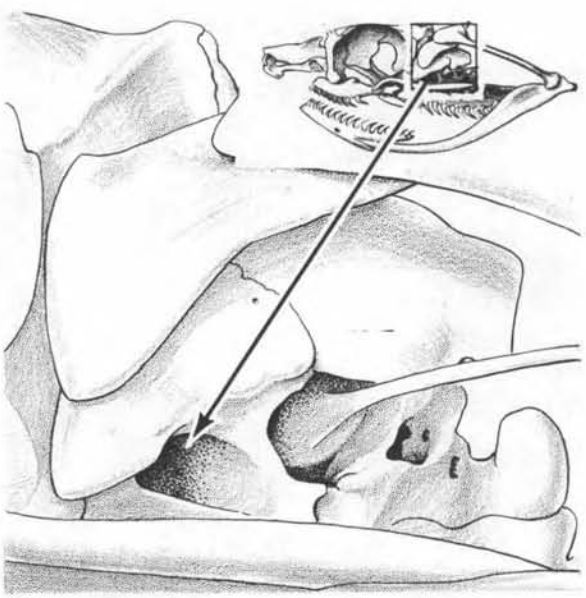


FIGURE 1. Heterodon platyrhinos (AMNH 69647) proötic region showing single trigeminal foramen.

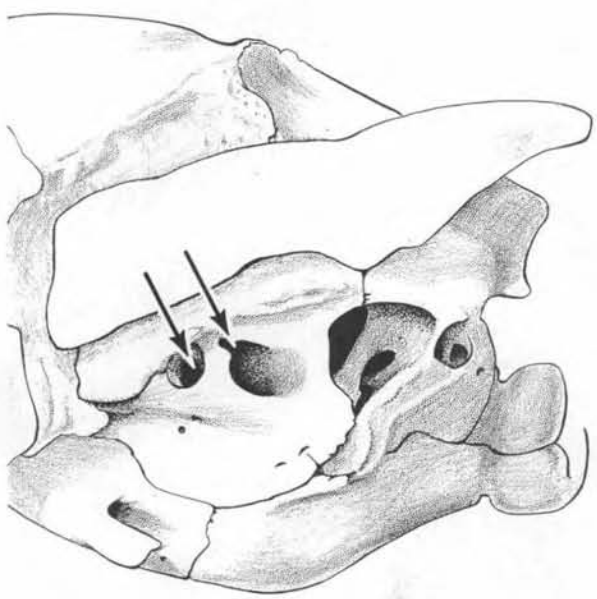


FIGURE 2. Heterodon platyrhinos (AMNH 63590) proötic region showing double trigeminal foramen. [Quadrate, ectopterygoid,and pterygoid removed.]

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AMERICAN MUSEUM OF NATURAL HISTORY
New York, NY 10024

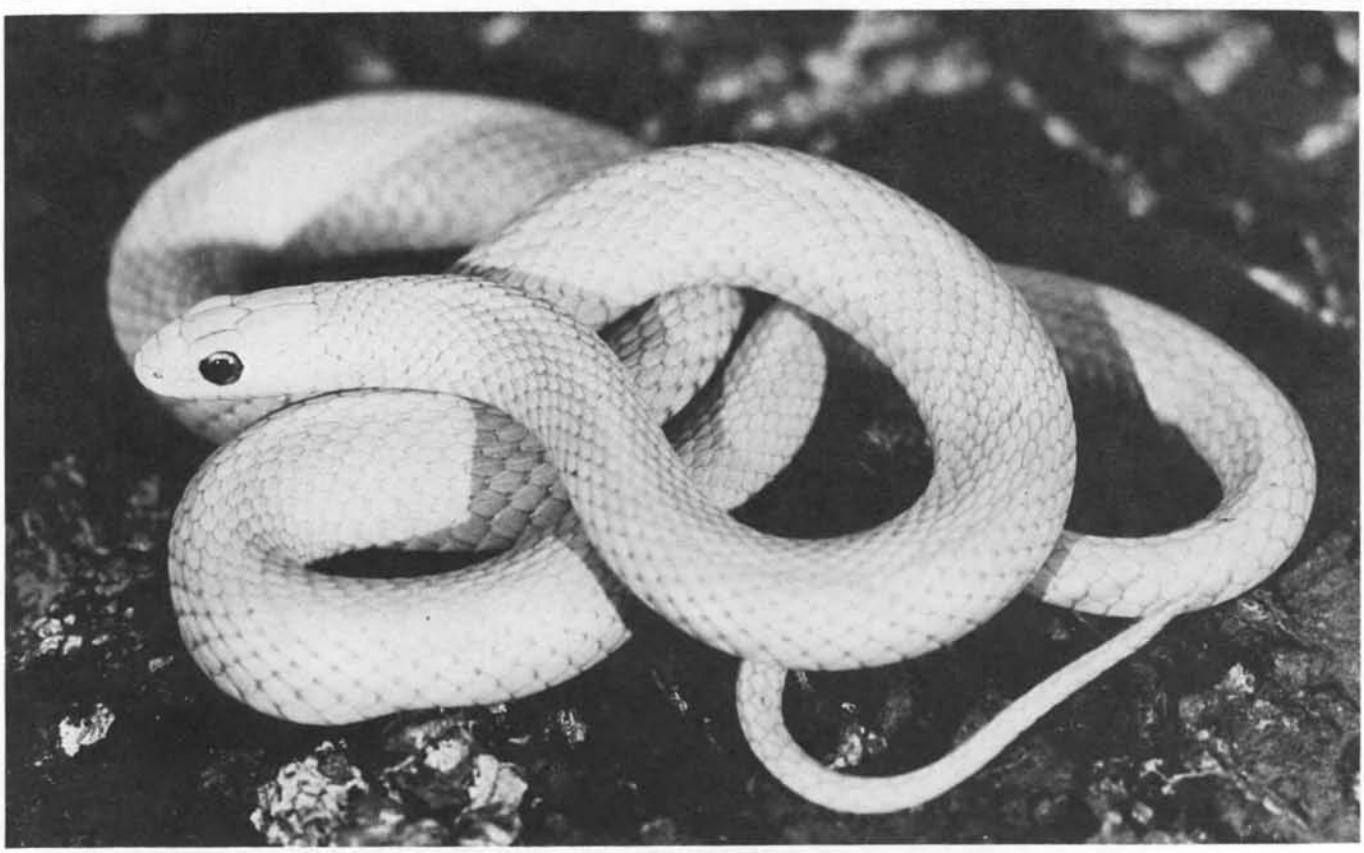
Harless, Marion & Henry Morlock

A BIBLIOGRAPHY OF TURTLE BEHAVIOR, INCLUDING REFERENCES TO ECOLOGY AND PHYSIOLOGY

Catalog of Selected Documents In Psychology, 1972, 72, 60. (Abstract)

Approximately 1,060 references pertaining to turtle behavior are listed with prefatory comments on additional sources. References that focus on paleontology, taxonomy, parasitology, collection site records, morphology, and anatomy have been generally excluded unless the reference included comments on behavior. Psychological, natural history, life-history, and ecological references clearly relate to behavior, whereas some of the physiological references are more obviously concerned with biochemistry than behavior. Reprints published by the Society for the Study of Amphibians and Reptiles will probably continue to make material from the past century available and a new nonprofit search service should keep turtle researchers aware of future publications. (74 pages/$2.00)

The bibliography may be purchased from:
Journal Supplement Abstract Service
American Psychological Association
1200 Seventeenth Street, N.W.
Washington, DC 20036



A leucistic specimen of the Short-headed Gartersnake, Thamnophis brachystoma. An adult male (254 mm snout to vent) collected along Chappel Fork, between Kinzua Dam and Marshburg, McKean Co., Pennsylvania, on 21 August 1971. The specimen is white with pale beige dorsal stripes. The iris appears to be normally pigmented. -- G. C. Schaefer (Dept. Biological Sci., Kent State University, Kent, Ohio 44242).

AN UNUSUAL SPECIMEN OF Thamnophis marcianus FROM VERACRUZ, MEXICO

Douglas A. Rossman

While my recent paper (Rossman, 1971) on the Neotropical populations of Thamnophis marcianus (Baird and Girard) was in the hands of the printer, Ronald A. Brandon sent me an unusual specimen of this species from the Mexican state of Veracruz. Circumstances prevented its being discussed in that paper, but the animal is taxonomically and zoogeographically puzzling and deserves comment.

The snake (Southern Illinois Univ. uncatalogued) was collected along the banks of the Rio Jamapa, 9 miles S Huatusco, Veracruz, on 4 July 1965 by Ronald A. Brandon and Ronald Altig. It is an adult male measuring 388 mm snout-vent (the tip of the tail is missing) and having 19-19-17 dorsal scale rows, semi-divided preoculars, 152 ventrals, 30 teeth on the left maxilla, a very dark brown dorsum with most scales heavily impregnated with black pigment (less densely so in the one or two rows immediately above the lateral stripe), a tan vertebral stripe three scales wide, an uninterrupted light greyish tan lateral stripe occupying the second and third dorsal scale rows, two rows of small semicircular black spots on the venter, and a typical marcianus head pattern (Fig. 1).

The Veracruz snake agrees with Thamnophis marcianus praeocularis in maximum dorsal scale row number, condition of the preoculars, number of maxillary teeth, nature of the vertebral stripe, and ventral pattern. It is similar to lowland Mexican T. m. marcianus in ventral number and in having the lateral stripe uninterrupted by extensions of the anterior lateral blotches. The darkness of the dorsum is unique to this specimen, which probably is best considered an intergrade although it is considerably closer to T. m. praeocularis than to the nominate race. This presents a puzzling situation inasmuch as four specimens from the Chiapas-Tabasco lowlands, which I also consider to be intergrades and which come from an area nearly 350 miles closer to the range of T. m. praeocularis, have many more features in common with T. m. marcianus. Specimens from southern Veracruz and western Tabasco are much to be desired.

The Rio Jamapa collecting site is atypical for Thamnophis marcianus. The stream rushes through a heavily vegetated, rocky gorge in a rain forest-cloud forest transition zone at an elevation of 4500', the only non-lowland locality for this species in eastern Mexico or Central America.

LITERATURE CITED

ROSSMAN, DOUGLAS A. 1971. Systematics of the Neotropical populations of Thamnophis marcianus (Serpentes: Colubridae). OCC PAPERS MUS ZOOL LOUISIANA ST UNIV (41): 1-13.

Museum of Zoology
LOUISIANA STATE UNIVERSITY
Baton Rouge, LA 70808

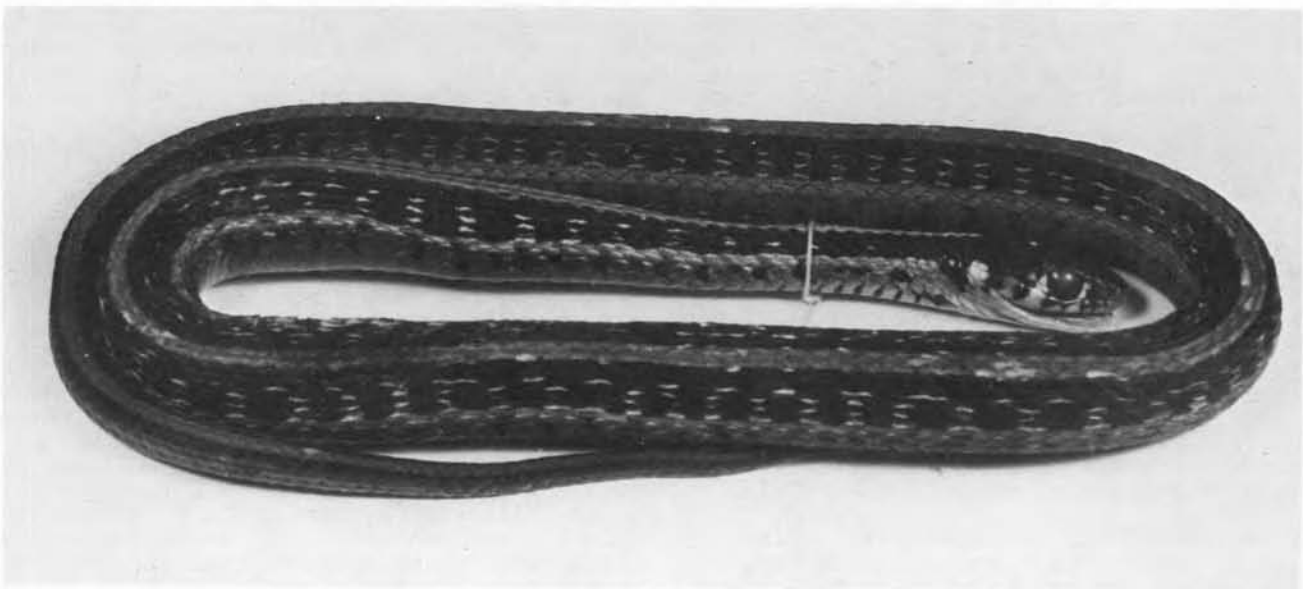


FIGURE 1. Male specimen of Thamnophis marcianus from the Rio Jamapa, 9 miles S Huatusco, Veracruz, Mexico. Photograph by R. M. Blaney.

GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW will publish brief notices of new geographic records in order to make these available to workers in published form. The STANDARD FORMAT for these records is:

SCIENTIFIC NAME. Locality [air-line distance and direction from a town]; Date; Collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY, and address.

Please submit new locality records to: GEORGE R. ZUG, Division of Reptiles & Amphibians, National Museum of Natural History, Washington, DC 20560.

Contributions to this page may be cited as follows:

TUCK, R. G., Jr. 1972. Geographic distribution: Hemidactylus palaichthus. HERPETOL REV 4(3): 93.

NEW RECORDS

C A U D A T A

AMBYSTOMA MACULATUM. U.S.A., Wisconsin, Polk Co., 3.2 miles SW of St. Croix Falls in Interstate Park on St. Croix River (T33N, R19W, NE 1/4 of NW 1/4 Sec. 1); 20 April 1972; M. Connolly, B. Haber, J. Lang. J. Lang. Bell Mus. Nat. Hist., Univ. Minnesota BMNH 3963-3965. Range extension of 94 miles WNW of specimen collected in 1928 in Worden Twp., Clark Co., Wisc. (Field Mus. Nat. Hist. 14698). A breeding population approximately 20 egg masses of A. maculatum were seen in the temporary pond. Submitted by J.W. LANG.

HEMIDACTYLUM SCUTATUM. U.S.A., Wisconsin, Bayfield Co., 2 miles NE of Drummond (T45N, R7W, NE 1/4 of SE 1/4 Sec. 27); 6 May 1972; J. Lang. J. Lang. Bell Mus. Nat. Hist., Univ. Minnesota, BMNH 3958. Range extension of 97 miles NNE of specimens collected in Interstate Park, Polk Co., Wisc., BMNH 3249-3254. Two additional specimens of H. scutatum were collected 2 miles N of Barronett, Washburn Co., Wisc. (T37N, R13W, NE 1/4 of SE 1/4 Sec. 20) on 14 May 1972, BMNH 3961-3962. Submitted by J. W. LANG, Dept. of Ecology and Behavioral Biology, Univ. of Minnesota, Minneapolis, MN 55455.

EURYCEA LONGICAUDA MELANOPLEURA. U.S.A., Missouri, Pettis Co., 4 miles NW of Sedalia at Georgetown Quarry; 5 May 1972; R. Krager. M. A. Nickerson. Milwaukee Public Mus., MPM 4416. Most northwestern record from Missouri. Submitted by MAX A. NICKERSON, Vertebrate Division, Milwaukee Public Museum, Milwaukee, WI 53233.

T E S T U D I N E S

GRAPTEMYS PSEUDOGEOGRAPHICA OUACHITENSIS. U.S.A., Indiana, St. Joseph Co., 4.4 miles SSE of South Bend at Kensington Farms lagoon in Bowman Creek drainage; 25 April 1972; T. Nowak. K. Adler, J. W. Burling and G. Zug. U.S. Natl. Mus., USNM 194611. First record for St. Joseph River drainage (Lake Michigan system) and for northwestern Indiana. Submitted by JOHN W. BURLING.

CHRYSEMYS SCRIPTA ELEGANS. U.S.A., Indiana, St. Joseph Co., 5.5 miles SSW of South Bend along Bowman Creek; August 1971; J. W. Burling. K. Adler, J. W. Burling and G. Zug. U.S. Natl. Mus., USNM 194610. First record for St. Joseph River drainage (Lake Michigan system). Submitted by JOHN W. BURLING, 21623 Carriage Lane, South Bend, IN 46614.

S A U R I A

HEMIDACTYLUS TURCICUS TURCICUS. U.S.A., Texas, Jim Wells Co., Alice; 1-3 July 1972; G. Keown. G. Keown and R. O. Albert. Collection of G. Keown 202-3. The only prior Texas record is Brownsville, Cameron Co. (Conant, 1958: 91). From 1962 to date, I have seen both adults and juvenile turcicus on various buildings in Alice. This record extends the range 160 miles north of Brownsville. Submitted by GERALD KEOWN, P.O. Box 267, Alice, TX 78332.

S E R P E N T E S

FICIMA CANA. U.S.A., New Mexico, Valencia Co., 3 miles (rd) E Belen on NM hwy. 6; 6 June 1968; M. A. Williamson. M. A. Williamson. Mus. Southwestern Biol., Univ. New Mexico, MSB 22103. First record for Valencia Co. and extension of range approximately 60 miles north. Submitted by MICHAEL A. WILLIAMSON.

LAMPROPELTIS TRIANGULUM CELAENOPS. U.S.A., New Mexico, Torrance Co., 7 miles (rd) S Moriarty on NM hwy. 41; 27 July 1971; M. A. Williamson; Collection of M. A. Williamson 571; and 1 mile (rd) E Encino on USA hwy. 285; 19 May 1972; M. A. Williamson. K. L. Williams. MAW 761. Southern extension of the species range of approximately 50 miles. Submitted by MICHAEL A. WILLIAMSON.

MICRURUS FULVIUS TENERE. U.S.A., Arkansas, Union Co., 2 miles E El Dorado and 6 miles NE hwy USA 82; 26 November 1970; M. Hardage. H. W. Robison. Southern State College, SSC 116. Arkansas, Lafayette Co., 2.5 miles N Lewisville; 26 February 1972; H. W. Robison. H. W. Robison SSC 140. Coral snakes have been found the following Arkansas counties: Hempstead (Univ. Arkansas Dept. Zool., UADZ 181), Nevada (U. S. Natl. Mus., USNM 127237), Miller (Dellinger and Black: Occ. Papers Univ. Arkansas Mus. (1938) (1): 37,

and Ouachita (UADZ 1420). These three specimens confirm the presence of M. f. tenere in southeastern Arkansas and add two new counties to their range. Submitted by H. W. ROBISON, Dept. Biol. Sci., Southern State College, Magnolia, AR 71753.

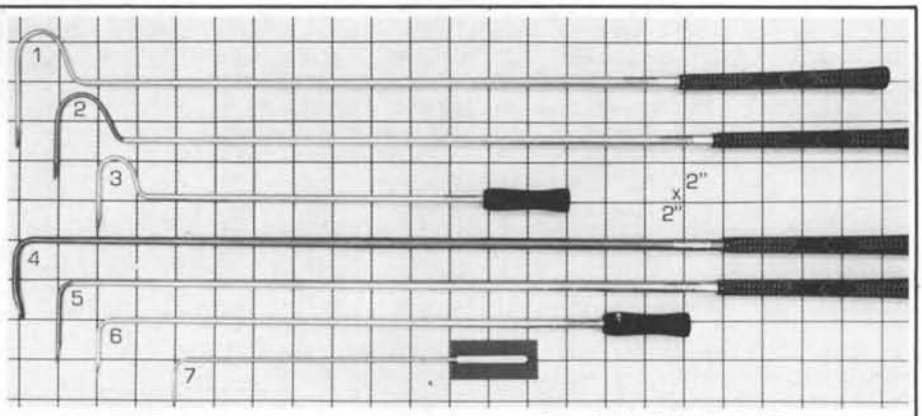
RHADINAEA FLAVILATA. U.S.A., North Carolina, Dare Co., Roanoke Is.; 10 June 1960; J. F. Parnell; North Carolina State Mus. Nat. Hist. NCSM 3409; and 16 May 1961, C. L. Gifford, NCSM 3255; Nags Head Woods, off Martin St., Nags Head (Village); 30 May 1970; J. Bockowski & R. Zappalorti, NCSM 9346-9347. First records north of Pamlico Sound and on Outer Banks north of Bogue and Shackleford Banks (Engles, 1962, Amer. Midl. Nat. 47: 702-742; Myers, 1967, Bull. Florida State Mus. 11 (4: 47-97). Other new county records in North Carolina are: Craven Co., Ellis Lake near Havelock, 3 October 1964 and 8 October 1966, J. R. Bailey and parties, Duke Univ., DU R-1780, R-2887; 8 miles N Bridgeton, 23 July 1966, L. D. Dunnagan, NCSM 4457. Jones Co., 4 miles SE Maysville, 21 April 1963, W. M. Palmer, NCSM 1163. Onslow Co., 12 miles SSE Jacksonville, 2 July 1963, J. R. Bailey and party, DU R-1562; 5 1/2 miles NW Holly Ridge, 20 June 1970, D. L. Stephan, NCSM 9370; 2 miles SE Folkstone, 14 August 1971, D. L. Stephan, NCSM 10745. Pamlico Co., 4 miles S Arapahoe, 18 August 1965, R. D. Miller, NCSM 4080. Pender Co., 4 miles SW Maple Hill, 6 August 1966, J. H. Hunt, NCSM 4495; 5 1/2 miles NE Burgaw, 7 May 1970, D. L. Stephan, NCSM 9283-9284, and 22 May 1971, A. L. Braswell, W. M. Palmer, and D. L. Stephan, NCSM 10233-10234; near Currie, 13 April 1968, H. Hufham, NCSM 10034; near Rocky Point, 20 May 1969, B. Hamilton, NCSM 10041; 4 1/2 miles SE Currie, 27 May 1972, D. L. Stephan, NCSM 11271. Sampson Co., 4 1/2 miles S Rosebora, 12 June 1971, E. D. Bruner and W. M. Palmer, NCSM 10310; 3 miles NW Ivanhoe, 20 August 1971, D. L. Stephan, NCSM 10760; 3 miles SE Ingold, 27 May 1972, D. L. Stephan, NCSM 11265-11266. Specimens were collected inside or under rotting logs or beneath debris in pine flatwoods (Pinus palustris, Aristida spp., Vaccinium spp.); some were found on paved roads at night. Submitted by WILLIAM M. PALMER, N. C. State Museum of Natural History, Raleigh, NC 27611 and DAVID L. STEPHAN, Dept. Entomology, N. C. State Univ., Raleigh, NC 27607.

TRIMORPHODON BISCUTATUS LAMBDA. U.S.A., New Mexico, Hidalgo Co., 3.1 miles (rd) NE Animas exit on USA hwy. 70; 9 September 1967; M. A. Williamson. M. A. Williamson. MAW 266. Eastern extension of range into New Mexico; Gehlbach (1971 Herpetologica 27: 200) defines range as west of Chiricahua Mts., Arizona. Submitted by MICHAEL A. WILLIAMSON, Dept. of Biology, Univ. of New Mexico, Albuquerque, NM 87106.

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A NEW RECORD OF THE DESERT STRIPED WHIPSNAKE (Masticophis taeniatus taeniatus) FROM THE PROVIDENCE MOUNTAINS REGION OF SAN BERNARDINO COUNTY, CALIFORNIA

Timothy W. Brown

On June 15, 1970 a desert striped whipsnake (Masticophis taeniatus taeniatus) was found DOR on Black Canyon Road approximately 0.8 km. south of Cedar Canyon and about 11.2 km. southeast of the town of Cima, California. This location lies at an elevation of 1545 meters in the Mid-Hills section of the Providence Mountains (see Mid-Hills, California quadrangle, USGS 15' series. T. 12N, R. 14E, S. 31). The snake is a female with a snout-vent length of 508 mm. and a tail length of 221 mm. No eggs were present, nor had the snake recently fed. The specimen has been placed in the Museum of Vertebrate Zoology, University of California, Berkeley (MVZ 100271).

The Mid-Hills region is a rolling plateau dotted with granite outcrops and rhyolitic buttes. It lies at an elevation of 1500-2000 meters between the Providence Mountains to the south and the New York Mountains to the northeast. This upland complex is entirely surrounded by Lower Sonoran Desert bajadas and basins which dip as low as 600 meters in elevation to the southeast. The Mid-Hills vegetation is strongly suggestive of the Great Basin Desert some 280 km. to the north (Jaeger, 1957). Pinyons (Pinus spp.) and Utah juniper (Juniperus osteosperma) form an open woodland in most places, while the shrubs are dominated by big sagebrush (Artemisia tridentata), antelope bush (Purshia glandulosa), and rabbitbrush (Chrysothamnus spp.). This plant association contrasts sharply with the vegetation at lower elevations. There the bajadas support a yucca-Joshua tree (Yucca brevifolia) community, while the low basins are dominated by a sparse creosote bush (Larrea divaricata) scrub. Thus the Providence Mountains - Mid-Hills - New York Mountains complex appears to support a relict Great Basin Desert community at higher elevations isolated by climatically unsuitable lowlands on all sides.

Apparently Masticophis taeniatus is uncommon but not rare in the Mid-Hills. Local ranchers and the rangers at Mitchell's Caverns State Park report seeing several each year. Johnson et al (1948) do not mention this snake in their report of this area. However, they do report having taken three specimens from the higher elevations of Clark Mountain, a similarly isolated upland 48 km. to the north. Stebbins (1954 and 1966) also records the Clark Mountain population but none from the Providence Mountains area.

Therefore, the Providence Mountains - Mid-Hills population of Masticophis taeniatus taeniatus appears to be the southernmost in California and a true postglacial relict of the Great Basin Desert. The Great Basin fence lizard (Sceloporus occidentalis biseriatus) is also found in this area. It is likely that further studies will turn up still other relict species in this isolated upland complex.

I wish to thank Dr. Robert C. Stebbins of the University of California, Berkeley, for his helpful advice on the known distribution of Masticophis taeniatus.

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Pomona, CA 91766

HERPETOLOGICAL SPECIES INTRODUCED ONTO HAWAII

Bufo boreas
Bufo marinus
Dendrobates auratus
Rana areolata
Rana catesbeiana
Rana clamitans
Rana nigromaculata
Rana rugosa

Trionyx sinensis

Anolis carolinensis
Lygosoma metallicum

Typhlops braminus

REFERENCE

FLINT, CHARLES. 1972. The reptiles and amphibians of the Hawaiian Islands. HERPETOLOGY 6(1): 8-11.

A PLEA FOR CONSERVATION

Harold A. Dundee

The following plea was made at the June 1972 meeting of the American Society of Ichthyologists and Herpetologists. Dr. Dundee asked that it appear in HERPETOLOGICAL REVIEW so that the remarks receive a wider audience.

In recent years the American Society of Ichthyologists and Herpetologists has expressed its concern about the future of our faunal heritage. Indeed, it has gone far to express its concern by vigorously supporting the endangered species act; by pushing for federal legislation to place the alligator under interstate commerce protection; by recommending guidelines for responsible conduct of research activities, especially as regards procuring animals for research; and as of the 1972 meeting we debated our feelings concerning introductions of exotic species without adequate pre-introduction studies. Yet we still disregard the danger signals that have been raised. Despite resolutions made at the 1971 meeting and their publication in the December 1971 issue of Copeia, flagrant disregard for guidelines is evident.

I would like to emphasize at this time aspects of three of the resolutions as food for thought. Please, --- please expose to your collective consciences the following:

1. Deliberate introductions. Recent new locality records for reptiles in Florida, Texas, and Louisiana, for example, are directly traceable to the dubious pleasures of having intriguing and interesting exotics enlivening the local collecting scene. Some such introductions have been made by members of our several professional herpetological societies. Introductions not only may flaw our concepts of natural zoogeographic distributions but especially they may disrupt normal ecosystems to the extent that the native fauna & flora may be severely damaged.

2. Scientific collecting. The encouragement of student collecting to augment zoogeographic knowledge of local or state faunas, which has undoubtedly brought to light greatly valuable and more complete knowledge, is fraught with pitfalls to the scholar who utilizes the information. Not only may such collecting decimate local faunas but more important the award of grade credits for such collections, especially when bonuses are offered for specimens from other than say the home country, may result in considerable deliberate falsification of collection data by the ever grade-conscious student.

3. Commercial exploitation. We have seen an unprecedented rise in amateur collector enthusiasm and the building of institutional collections, and concommitantly a great rise in the number of dealers trafficking in sales of lower vertebrates. All too often the dealers, encouraged by the high price that can be commanded for rare species or creatures of limited distribution, have made heavy inroads on those animals. Recent price lists have offered items such as Bufo exsul, Plethodon longicrus, Lampropeltis mexicana blairi, and Crotalus w. willardi at prices up to $250. Such crass commercialization can lead to rapid demise and extinction of many species long before we are prepared to examine significant aspects of their biologies.

It would be to the best long range objectives of scientists if they would boycott such dealers or foster action for suitable local or federal legislation to restrict their activities.

I know that many of us, including myself, could find ourselves living in the proverbial glass house. From conversations with various herpetologists I am aware that there may be strenuous objections to "policing" of our scientific endeavors but we must face the fact that we can indeed easily be our own worst enemies. An extinct species is not a renewable resource. Thus my plea that this is a time for us to expose our consciences to the realities of life and to reexamine the resolutions of the 1971 meetings and begin to conform to their recommendations.

Department of Biology
TULANE UNIVERSITY
New Orleans, LA 70118

CURRENT HERPETOLOGICAL TITLES, XXII: 1971 - 1972

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We have brought to your attention more than 20,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and more than 1000 through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, etc. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. A complete list of the journals covered by us is published in Herpetol. Yearb. 1971. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1971-1972) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be more current than the previous quarterly issues allowed.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 1 June 1972 through 31 July 1972. HR is computer printed and because of necessary production procedures there is a possibility that on occasion the titles from a single issue of a journal may appear in several issues of HR. Periodical title abbreviations follow the International List of Periodical Title Word Abbreviations (based on the Amer. Nat. Standards Comm. Z39.) (Chemical Abstracts Service, Columbus, Ohio, US.).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and M. Coxe. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

This is contribution Number 44 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

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October 1972

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AL-JUMAILY,MASAA M.
1971. A new record of the Amphisbaenian Blanus bedraigai Boulenger in Iraq.
BULL BIOL RES CENT BAGHDAD 5:83-84, 2 fig.

ALEKSIEV,BORIS and RUDOLF SHIPOLINI
1971. Further investigations on the fractionation and purification of the toxic components from the venom of the Bulgarian viper (Vipera ammodytes ammodytes).
HOPPE-SEYLER'S Z PHYSIOL CHEM 354:1183-1188, 6 fig., 1 tab. (Ger, Engl summ).

AMBROSIUS,H. and R.HANSTEIN
1971. Contributions to the immunobiology of poikilothermic vertebrates. VI. The dynamics of antibody producing cells in the lymphoid organs of the frog Rana esculenta L.
ACTA BIOL MED GER 27:771-782, 3 fig., 4 tab. (Ger, Engl summ).

AMBROSIUS,H.
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FOLIA HAEMATOL (LEIPZIG) 96:313-332, 16 fig., 7 tab. (Engl summ).

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ANON
1971. On alligators.
AUDUBON 73(1):100.

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1971. The governments of Costa Rica, Nicaragua, and Panama have agreed to a total prohibition on the taking of green turtles and their eggs for three years.
AUDUBON 73(1):108.

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1971. The great frog war.
SCI DIG 69(3):29-30, illus.

ANON
1971. Green turtle explosion: a disappearing species is protected.
SCI DIG 69(8):inside 2nd cover, photo.

ANON
1971. Lukautim wail laip bilong yumi.
NIUS BILONG YUMI 13(13):2.

ANON
1971. Natural history: 7 Indian pythons hatched in the Jaipur Zoo, India.
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HERPETOLOGICAL REVIEW publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals. Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome.

FORMAT. Manuscripts should be type-written on white bond paper, one side only. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and the animal group(s) included. Use standard abbreviations for journals.

The 1971 YEARBOOK OF HERPETOLOGY (published by HISS) contains a list of American Standard abbreviations for some 2,500 journals. Other publications that will be of assistance in the preparation of manuscripts are:

CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES (see information on this page).

Common names for North American amphibians and reptiles (COPEIA 1956(3): 172-185).

SCIENTIFIC WRITING FOR GRADUATE STUDENTS, by F. Peter Woodford (Rockefeller Univ. Press, New York, NY 10021). $5.75.

STYLE MANUAL FOR BIOLOGICAL JOURNALS (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, DC 20016). $3.00.

A publication that will be found helpful in planning and producing adequate illustrations is:

A HANDBOOK OF BIOLOGICAL ILLUSTRATION, by Frances W. Zweifel (University of Chicago Press, 58th Street at Ellis Avenue, Chicago, IL 60637).

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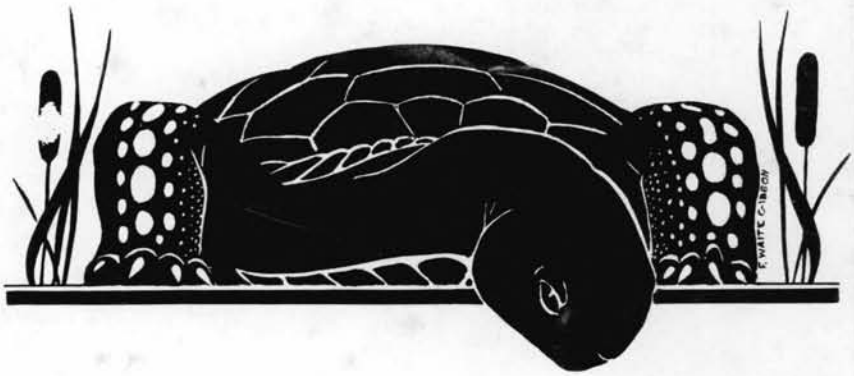
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28 - 29 December 1972



herpetological REVIEW

THE NEWSLETTER ON AMPHIBIANS AND REPTILES...
AND THE PEOPLE WHO STUDY THEM

VOLUME 4, NUMBER 4
AUGUST 1972

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The Society was founded in 1958 as the OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information of these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communication between amateur and professional workers. (See Third Cover for membership information.)

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Herpetological Review

Produced for the

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

and the

HERPETOLOGISTS' LEAGUE

by

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***

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In 1971 it had 900 members and fellows (including Life and Honorary members), and more than 400 institutional subscriptions to its journal, HERPETOLOGICA, which has been published continuously since 1936.

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Herpetological Review

VOLUME 4, NUMBER 4
AUGUST 1972

-- N E W S A N D A N N O U N C E M E N T S --

122 LETTERS

123 CALENDAR AND NOTICES

124 THE LAKE TEXOMA MEETING: Program and Abstracts.
131 MORE HERPETOLOGICAL SOCIETIES.

132 UNIONE ERPETOLOGICA ITALIANA
130 NEW PUBLICATIONS

138 THE NEW REPTILE HOUSE AT THE PHILADELPHIA ZOO.

-- D E P A R T M E N T S --

129 HERPETOLOGICAL HUSBANDRY: Trans-Pecos Ratsnakes, by Johnathan A. Campbell.

131 GEOGRAPHIC DISTRIBUTION: Striped Mud-turtle from South Carolina, by Michael Duever.

CONSERVATION
133 Reptiles, Amphibians, and the Law, by H. Bernard Bechtel and Elizabeth Bechtel.

137 ASIH Resolution Number 3, 1971

140 CURRENT HERPETOLOGICAL TITLES, XXI.

-- S O C I E T Y N O T E S --

123 MEMBERS DESIDERATA: M. K. Jackson wants snake skin.

132 SSAR-HL JOINT CONSERVATION COMMITTEE APPOINTED.

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A number of letters supporting additional subscriptions for "Current Titles" have been received.

National Museum of Natural History · Smithsonian Institution
WASHINGTON, D.C. 20560 · TEL. 202-628-1810

June 6, 1972

Dr. Herndon G. Dowling
Genera of Reptiles
American Museum of Natural History
Central Park West at 79th Street
New York, New York 10024

Dear Herndon,

In response to your editorial in the most recent Herp Review, please record me as **willing** to support HISS to the amount of $25.00 a year. I hope you get sufficient response from other herpetologists willing to help keep the operation going so that we can continue to have the services you have successfully started.

Cordially,

James A. Peters
Curator
Division of Reptiles and Amphibians

THE MARYLAND HERPETOLOGICAL SOCIETY

2643 NORTH CHARLES STREET
BALTIMORE, MARYLAND 21218

Office of the President
Robert G. Tuck, Jr.

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Riverdale, MD 20840
5 June 1972

Dr Herndon G. Dowling
Editor
HERPETOLOGICAL REVIEW
Herpetological Information Search Systems
The American Museum of Natural History
Central Park West at 79th Street
New York, NY 10024

Dear Dr Dowling:

During the organizational meeting of the Eastern Seaboard Herpetological League [ESHL] on 23 April 1972, one of our first official acts was to go on record collectively in support of the HISS project "Current Herpetological Titles" [HERPS-ACCORD 3, p. 1].

This resolution was in direct response to your editorial, which appeared in HERPETOLOGICAL REVIEW, 4(2): 28, April 1972, and it represented a genuine belief in the real need for such a bibliographic effort among those of us in regional herpetological groups.

At this time I wish to express my <u>personal</u> confidence in the substantial contribution made to herpetology by "Current Titles" and my deep desire to see this project continued without interruption. Accordingly, I hereby pledge an additional payment of ten dollars ($10.00) annually in order to continue receiving "Current Herpetological Titles."

Furthermore, I call upon <u>all</u> herpetologists -- professional, paraprofessional, and amateur -- to stand up and make their pledges NOW!

Sincerely,

Robert G. Tuck, Jr.
Coördinator, ESHL

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE, LEIDEN.

Dr. H.G. Dowling,
Department of Herpetology : HISS
American Museum of Natural History,
Central Park West at 79th Street,
New York, N.Y. 10024,
U.S.A.

Leiden, June 14 1972

Dear Dr. Dowling,

In the April 1972 issue of Herpetological Review I read your editorial in which you ask members to write whether they appreciate the Current Herpetological Titles and if so, whether they are willing to pay more for it next year. As the "Titles" are of much help to me, I am glad to tell you that The Rijksmuseum van Natuurlijke Historie is prepared to pay ƒ 10.- a year more when this would turn out to be necessary.

Sincerely yours,

M.S. Hoogmoed,
Curator, Division of
Reptiles and Amphibians.

MEETINGS AND SOCIETIES

CALENDAR 1972

14-17 August...Combined Meeting: HERPETOLOGISTS' LEAGUE and SOCIETY FOR THE STUDY OF AMPHIBIANS and REPTILES, University of Oklahoma Biological Station, Lake Texoma.

27 August - 1 September...AMERICAN SOCIETY OF ZOOLOGISTS, University of Minnesota (with AIBS).

11-15 September....INTERNATIONAL SOCIETY ON TOXINOLOGY, General Meeting, Institute of Organic Chemistry, Darmstadt, West Germany.

24-30 September...INTERNATIONAL CONGRESS OF ZOOLOGY, Monaco.

26-28 December....HERPETOLOGISTS' LEAGUE, Annual Meeting (Cosponsored by the SSAR), Washington, D.C. (with AAAS).

CALENDAR 1973

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, San Jose, Costa Rica.

4-11 August....FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

CALENDAR 1974

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Ottawa, Canada.

INDIVIDUALS AND INSTITUTIONS

ROBERT E. GORDON (VP for Advanced Stud., Univ. Notre Dame) received the Council of Biology Editors' "Award for Excellence in Scientific Communication" at a banquet during the Sixteenth Conference of CBE on 15 May.

GEORGE CALLISON (Los Angeles County Mus. Natur. Hist.) is seeking the evolutionary relationships of New World boids in both living and fossil material.

R. BRUCE BURY (Mus. Vert. Zool., Univ. Calif.) has been appointed to a position at the U. S. National Museum. Because of his broad interests in conservation, he has also been appointed Conservation Editor for HR.

RICHARD G. ZWEIFEL and CHARLES J. COLE (Amer. Mus. Natur. Hist.) will be at the AMNH Southwestern Field Station, near Portal, Arizona, for a summer's research.

JOHN W. CRENSHAW (Univ. Rhode Island) has moved to the School of Biology, Georgia Institute of Technology, Atlanta.

The 19th SYMPOSIUM ON VERTEBRATE PALEONTOLOGY AND COMPARATIVE ANATOMY was held in Bristol, England, on 28 September through 1 October 1971. Among the contributions were a new classification of the Boidae, with a discussion of their radiation by GARTH UNDERWOOD. Work on the intervertebral joints of snakes and lizards was described by LESLEY SHEPPARD and ANGUS BELLAIRS. ELAZAR KOCHVA showed a film on vipers feeding after removal of their venom glands.

Volume 4 of the SNAKE, a journal published by the Japan Snake Institute, will appear in 1972. Because of devaluation of the US dollar, each issue will now cost $2.00 (volume 4 will consist of 3 issues). Back issues of the three previous volumes are still available at the new cost. Most articles are in Japanese, but have English summaries.

Subscriptions and inquiries should be addressed to:

The Japan Snake Institute
Yabuzuka 3318
Yabuzuka-honmachi
Nitta-gun, Gunma-ken
379-23 JAPAN

MEMBERS DESIDERATA

MORRIS K. JACKSON (Dept. Anatomy, Medical Coll. Georgia, Augusta, GA 30902) is working on the structure of cutaneous tactile sensory organs in snakes. He would appreciate any snake exuviae (sloughs) that zoos, museums, herpetariums, or individuals could send. It can be sent in a regular envelope. Please include name of species, and if available subspecies and collection data.

THE LAKE TEXOMA MEETING

PROGRAM AND ABSTRACTS

SUNDAY, 13 AUGUST 1972

1:00 PM Board of Directors Meeting, Library

4:00 PM Early Check-in and Registration, Lounge, Main Building

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MONDAY, 14 AUGUST 1972

8:00 AM REGISTRATION and Check-in, Lounge, Main Building, all day

8:00 PM Committee on Joint Cooperation Meeting
Lecture Room, Main Building

TUESDAY, 15 AUGUST 1972

All paper sessions will be held in the Library.

8:30 AM CALL TO ORDER: Clarence J. McCoy (Carnegie Museum), Chairman, Society for the Study of Amphibians and Reptiles.

WELCOME: Paul F. Sharp, President University of Oklahoma and Loren G. Hill, Director, University of Oklahoma Biological Station.

ANNOUNCEMENTS: Victor H. Hutchison, University of Oklahoma

CONTRIBUTED PAPERS

Robert G. Webb, (University of Texas - El Paso), Presiding.

9:00 AM Aggressive behavior in the Pacific pond turtle, Clemmys marmorata. R. Bruce Bury (Bureau of Sports Fisheries and Wildlife, Washington).

9:20 AM Aggressive display in some Guatemalan and Mexican anoles. Anthony A. Echelle, Alice F. Echelle (University of Oklahoma Biological Station), Henry S. Fitch (University of Kansas).

9:40 AM Shoreline imprinting in the tiger salamander (Ambystoma tigrinum). Douglas H. Taylor (Miami University), Kraig Adler (University of Notre Dame).

10:00 AM Salamander intraspecific and interspecific territoriality and social dominance, and their significance for interspecies competition. Gordon R. Thurow (Western Illinois University).

10:30 AM Coffee Break

11:15 AM Means for the mechanical immobilization of live snakes. William W. Youker and Henry L. Youker (Wheaton, Illinois).

11:35 AM A cytogenetic study of the turtles in the genera Clemmys, Mauremys, and Sacalia. John W. Bickham (University of Dayton).

11:55 AM Relationships of the water snakes (genus Natrix): A progress report. Douglas A. Rossman, W. Gary Eberle, Shou-hsian Mao, Herbert C. Dessauer, and Edmond V. Malnate.

Albert P. Blair (Tulsa University), Presiding.

2:00 PM Fatty acid composition of the dermal secretions of Plethodon cinereus. Thomas Rickrode, Charles F. Mueller and David Taylor (Slippery Rock State College).

2:20 PM Geographic Variation in Muscle Proteins from Cynops sp. in Japan and Ryukyu Islands. J. Kirwin Werner (Northern Michigan University).

2:40 PM The effects of mammalian glucagon on plasma glucose in the Mudpuppy (Necturus maculosus). Elliott Jacobson (University of Missouri).

3:00 PM An electrophonetic comparison of proteins in turtle species of the genera Clemmys, Mauremys, and Sacalia. Donald A. Merkle (University of Dayton).

3:20 PM Coffee Break

3:50 PM Temperature effects on energetics of the Rusty Lizard Sceloporus olivaceous. Ronald Dutton and Lloyd Fitzpatrick (North Texas State University).

4:10 PM The Pleistocene herpetofauna of Dark Canyon Cave, New Mexico. Edward O. Wiley III (Sam Houston State University).

4:30 PM Comparative cranial myology of North American natricine snakes. Alexander Varkey (Louisiana State University).

8:00 PM SMOKER - SOCIAL, Pavilion area, South Lawn, for all registrants.

WEDNESDAY, 16 AUGUST 1972

M. J. Fouquette (Arizona State University), Presiding.

8:30 AM Regulation of spiny lizard populations: a progress report. G. W. Ferguson and C. H. Bohlen (Kansas State University).

8:50 AM Population variability of Acanthocephala from Slider turtles. Joseph E. Bourque (Savannah River Ecology Laboratory, Aiken, South Carolina).

9:10 AM Sexual dimorphism in the mainland anoles. Henry S. Fitch (University of Kansas), Anthony A. Echelle and Alice F. Echelle (University of Oklahoma Biological Station).

9:30 AM Food item analysis of mixed tadpole populations from Thailand. W. Ronald Heyer (Pacific Lutheran University).

9:50 AM Reproductive strategy of the Tree Lizard, Urosaurus ornatus, in central Texas. Robert F. Martin (University of Texas - Austin).

10:10 AM Coffee Break

10:50 AM Occurrence of larval amphibians in a heated reservoir. David H. Nelson (Savannah River Ecology Laboratory, Aiken, South Carolina).

11:10 AM Species composition and man-induced changes in a complex of snake hibernacula in northern Utah. William S. Parker (University of Utah).

11:30 AM Density, growth rates and home range sizes of Phrynosoma cornutum in southern Dona Ana County, New Mexico. Richard D. Worthington (University of Texas - El Paso).

11:50 AM Ecological observations of Bufo marinus in Papua-New Guinea. George Zug, Eric Lindgren and John Pippet. (Smithsonian Institute, Washington, D.C.).

12:10 PM GROUP PHOTOGRAPH, South side of Main Building.

James R. Dixon (Texas A and M University), Presiding.

2:00 PM Herpetology, Conservation and Departments of Conservation. Max A. Nickerson and Adrian Czajka (Milwaukee Public Museum).

2:20 PM Herpetologists, their societies and publications. I. Gilboa and H. G. Dowling (Herpetological Information Search Systems, American Museum of Natural History).

2:40 PM Systematic Herpetology: Prognosis for the Future. William E. Duellman (University of Kansas).

3:00 PM Coffee Break

3:30 PM PANEL DISCUSSION on the Future of Herpetology - Where Goest Our Two Societies? Joint Committee on Cooperation (Kraig Adler, H. G. Dowling, R. E. Gordon, H. F. Landreth, C. J. McCoy, H. C. Seibert, W. W. Tanner, V. H. Hutchison, Chairman). The presentation by panel members will be followed by audience participation and discussion of possible future cooperative efforts to improve services for herpetology.

7:30 PM BANQUET, South Lawn.

THURSDAY, 17 AUGUST 1972

8:00 AM FIELD TRIP. Information and registration sheets for box lunches will be provided at the Registration Desk.

1:00 PM CHECK OUT of rooms and dormitories to be completed, except for persons needing individual arrangements to remain overnight.

Bickham, John W. (University of Dayton). A cytogenetic study of the turtles in the genera Clemmys, Mauremys, and Sacalia.

The current taxonomic status of the Clemmys complex of turtles places the genera Mauremys, and Sacalia in the subfamily Batagurinae, and the genus Clemmys in the subfamily Emydinae. These three genera were previously considered to be congeneric. Cytogenetic techniques were used to evaluate this partitioning. Air dried preparations of cultured leukocytes yielded high quality metaphase plates of representatives of all three genera. The diploid number has been found to vary in species within and between genera. Fluorescent techniques and differential staining methods were also used to aid in the identification of individual chromosome pairs.

BOURQUE, JOSEPH E. (Savannah River Ecology Laboratory and Wake-Forest Univ.). Population Variability of Acanthocephala From Slider Turtles.

Acanthocephalan populations in more than 60 Pseudemys scripta were collected from a variety of habitats on the Savannah River Plant in South Carolina. Comparison of parasite populations was in terms of: (1) number of species (2) dominant species (3) number of worms per host (4) size structure and (5) sex ratio. Four species of Neoechinorhynchus sometimes occurred simultaneously in a single turtle. In most habitats N. pseudemydis made up the largest percent of the parasite numbers. Size structure analysis of over 10,000 worms from 60 hosts showed high degree of variability in turtles from each collecting area. The coefficient of variation for the number of young worms was twice as high as for the total number of worms in the population, or the number lost. The largest worms (♂ 35mm; ♀ 60mm) were from hosts with relatively few parasites. Sex ratios and size class of worms were related.

BRODIE, EDMUND D., Jr., JOHN HENSEL, and JUDY JOHNSON (Clemson Univ., S.C.).

Toxicity and Defensive Behavior in the Salamander genus Taricha.

NO ABSTRACT RECEIVED

BURY, R. BRUCE (Bureau of Sport Fisheries and Wildlife). Aggressive behavior in the Pacific pond turtle, Clemmys marmorata.

There is little evidence of aggressive behavior in freshwater turtles and, in fact, an absence of agonistic behavior has been reported in Pseudemys scripta and Chrysemys picta. However, field studies on the Pacific pond turtle revealed several types of social interactions, including aggression. Antagonism among turtles during periods of aquatic activity was rare, but one fight was observed. There was a relatively high level of interaction when turtles were engaged in atmospheric basking. During 37 hours of observations a total of 146 interactions were recorded: 111 (76.5%) open mouth gestures, 11 (7.5%) attacks involving biting, and 24 (16.0%) instances of ramming. The open mouth gesture is regarded as a threat in that it preceded all hostile behavior and was responded to accordingly by conspecifics. Several factors influencing aggressive behavior are discussed. In this species aggression apparently serves to promote spacing during times of atmospheric basking and, perhaps, to obtain and maintain "preferred" sunning sites.

DUELLMAN, WILLIAM E. (Univ. Kansas). Systematic herpetology: Prognosis for the future.

Today we are witnessing a change in the utilization of systematic collections from conventional taxonomic and faunistic studies to interdisciplinary studies using collections as data bases for evolutionary and ecological models. We anticipate that this trend will continue but not to the exclusion of the more conventional uses, which are necessary for basic research on some taxonomic groups and in some poorly known geographic regions. As a result of this trend, systematic collections will be called upon to provide a greater variety of data to more diverse kinds of investigators associated with educational and/or research institutions, commercial firms, and state and federal agencies. Thus, not only will the utilization of systematic collections change, but the role of curators will change from that of caretaker-researchers to research-coordinators; more and more of the caretaker responsibilities will be handled by trained technicians. Curators will assume more responsibilities in coordinating the utilization of data bases (collections) with diverse kinds of research programs--environmental, epidemiological, etc. Renewed emphasis must be placed in acquiring well-documented collections from poorly known areas that are in danger of destruction. Interdisciplinary investigations will be most effective when systematic collections are fully automated.

DUTTON, RONALD H. AND LLOYD C. FITZPATRICK (North Texas St) Temperature Effects on Energetics of the Rusty Lizard, Sceloporus olivaceus.

The energy budgets of lizards, Sceloporus olivaceus, collected seasonally from Tarrant County, Texas were measured in the laboratory at 15, 20, 25, and 30 C. These temperatures approximate ambient field temperatures at time of collections. Prior to measurements, lizards were held at experimental temperatures for 4 days without food in environmental chambers. After this period, their rates and energies of ingestion, egestion, assimilation, respiration and production were determined.

The results of this study are reported in this paper.

Echelle, Anthony A., Alice F. Echelle and Henry S. Fitch (Univ. Okla. Biological Station and University of Kansas). Aggressive display in some Guatemalan and Mexican anoles.

A preliminary analysis is presented of aggressive display in some Guatemalan and Mexican anoles. Emphasis is given to some subspecific comparisons of dewlap characteristics and display-action-patterns.

Ferguson, G. W. and C.H. Bohlen (Kansas State Univ.). Regulation of spiny lizard populations: a progress report.

Data on density, movement, growth, survivorship, fecundity and social behavior are being collected from a small insular population of the prairie swift Sceloporus undulatus garmani. Several more generations will be monitored to provide baseline data on natural populations fluctuations and to answer the questions: 1) When in the life cycle are density dependent effects most severe, 2) are these effects mediated through social behavior? Simultaneously, more controlled studies are underway using experimental enclosures to answer these questions. Future goals include perturbations of potential limiting factors in natural populations and enclosed natural populations in order to construct quantitative models of population regulation, and comparative studies of regulation in short-lived and long-lived species or races of the species.

Fitch, Henry S. (U. Kansas), Echelle, Anthony A. & Echelle, Alice F. (U. Oklahoma) Sexual dimorphism in the mainland anoles.

In anoles as in most iguanids, sexual dimorphism is usual and involves larger size and better developed display organ (dewlap) in the male, related to combat, defense of territory and courtship. Sexual difference in size and habits may relieve intraspecific competition; Schoener and Williams have shown that such difference is characteristic of the allopatric insular species. On the mainland most species are sympatric with others in at least parts of their ranges, and as many as 7 species may occur together. In a few species such as Anolis limifrons and its near relatives, females average slightly larger than males. In some other species the sexes are approximately the same size, but in most males are larger — up to 1.32 times the linear dimensions of females in A. cuprinus. In most species the female lacks a colored dewlap; in some she has a dewlap that is relatively small, and in a few kinds she has a well developed dewlap comparable to the male's. Trends of sexual dimorphism in development of the dewlap do not parallel closely dimorphism in size. Trends of sexual dimorphism in ten species-groups are discussed.

GILBOA, I., and H. G. DOWLING (Amer. Mus. Natur. Hist., N.Y.). Herpetologists: their societies and publications.

The continuing specialization and compartmentalization within the field of herpetology, and the application of new techniques of research to this field, has led to the use of increasingly diverse serials for the publication of the results of this research.

Many contributors to the knowledge on amphibians and reptiles consider themselves ecologists, physiologists, or cytologists, rather than herpetologists. They do not belong to any of the herpetological societies, they do not attend herpetological meetings, and thus take no part in decisions made for the "herpetological community." Yet these workers produce a major portion of the information on amphibians and reptiles, and publish most of this in "outside" journals.

In 1969 for example, the 60 papers (by 48 authors) published in HERPETOLOGICA, the 60 articles and abstracts published in the JOURNAL OF HERPETOLOGY, and the 75 papers (by 68 authors) published in COPEIA altogether amounted to only 4.5 per cent of the "herpetological literature" for that year. Few institutions receive even a significant portion of the some 2000 journals in which the other 95.5 per cent appeared.

HEYER, W.RONALD. (Pacific Lutheran Univ.). Food item analysis of mixed tadpole populations from Thailand.

Gut contents were examined for 17 species of tadpoles from a series of ponds along a 6 km transect in Northwestern Thailand. Three morphological types of tadpoles were examined: those which have beakless mouthparts (8 species, family Microhylidae); those with scraping and chewing mouthparts (7 species, families Ranidae and Rhacophoridae); and those with a tube ending with horny lips (2 species, family Ranidae, genus Ooeidozyga). Two species of beakless larvae had different categories of food types in their guts: arthropods. All other species had the same types of food in the gut. Most species did not differ significantly in the sizes of the items in the gut. The methods and results of this study raise several questions about the feeding process in tadpoles.

Jacobson, Elliott
The effect of Mammalian Glucagon on Plasma Glucose in the Mudpuppy(Necturus maculosus).

The effect of mammalian glucagon on plasma glucose levels was studied in the paedogenic urodele, Necturus maculosus. Animals were kept in a temperature controlled and light controlled box at 22°C and 13 hrs light and 11 hrs dark respectively. Serial blood samples were collected from a cannula implanted in the dorsal aorta via the gastric artery and plasma glucose levels were determined by the glucose oxidase method. Plasma glucose levels of untreated animals were 39$\pm$ 5 mg% at completion of the operation and then declined to 11$\pm$ 2 mg% on the third post-operative day; the values remained relatively stable thereafter. The third post-operative day was chosen as the day to challenge the animal with the hormone. The effect of glucagon on plasma glucose was determined. Experimental animals received either 2 mg/Kg body weight or 1 mg/Kg body weight of glucagon in amphibian Ringer's; control animals received an equivalent amount of the hormone-free carrier. Plasma glucose levels for the group receiving glucagon at 2 mg/Kg body weight were significantly higher than those of the controls from 30 minutes through 24 hrs after infusion of the hormone. Plasma glucose levels for the group receiving glucagon at 1 mg/Kg body weight were significantly higher than those of the controls only at 30 minutes after the infusion of the hormone. The data demonstrate that mammalian glucagon has a hyperglycemic effect in Necturus maculosus.

MARTIN, ROBERT F. (Texas Memorial Museum; University of Texas, Austin) Reproductive strategy of the tree lizard, *Urosaurus ornatus*, in central Texas.

In 1971, during a period of severe drought, the reproductive season of *Urosaurus ornatus* extended from March through mid-August. Females became sexually mature at approximately 39 mm snout-vent length. Deutoplasmic activity commenced in March; ovulation began in late April. Hatchlings first appeared in late June. Individual females possessed multiple clutch potential; sufficient time was available to permit at least 3 clutches per season. Clutch size was larger earlier in the season ($\bar{X}$ = 6.3, May) than later ($\bar{X}$ = 4.5, June; $\bar{X}$ = 3.7, July; $\bar{X}$ = 4.2, August) and averaged 5 eggs per clutch overall. Oviducal egg complements averaged 23% of total body weight.

MERKLE, DONALD A. (Univ. of Dayton). An electrophoretic comparison of proteins in turtle species of the genera Clemmys, Mauremys, and Sacalia.

The current taxonomic status of the Clemmys complex of turtles places the genera Mauremys, and Sacalia in the subfamily Batagurinae, and the genus Clemmys in the subfamily Emydinae. These three genera were previously considered to be congeneric. Starch gel electrophoretic techniques were used to examine relationships within and between genera. Thirteen protein loci were examined, including those coding for general proteins, esterases, LDH, MDH, LAP, and GOT. Of the loci examined, LDH-2 showed the greatest generic specificity in separating the three taxa, and presumably could be useful in taxonomic work with other turtle genera. Certain other loci (e.g., MDH-1, MDH-2), while of limited taxonomic value in distinguishing between genera, were of value in delimiting intra-generic relationships.

NELSON, DAVID H. (Savannah River Ecology Laboratory and Michigan State University). Occurrence of larval amphibians in a heated reservoir.

From June, 1971, to May, 1972, samples were systematically removed from a reservoir receiving heated effluent from a nuclear reactor in South Carolina. Specimens were caught with dipnets or minnow traps at study sites along 1200 meters of shoreline. Species diversity of thermally stressed areas is compared with that of cool water, natural seepage ponds flanking the reservoir. Larvae of the most common amphibians were found to inhabit the cooler shallows of the reservoir, although diversity was low in comparison to nearby natural areas. Developmental rates exhibited by Bufo terrestris tadpoles collected from different temperature regimes generally reflect the degree of thermal loading. Death from heat and fluctuating water levels appears to be the dominant limitation to larval success.

NICKERSON, MAX A. and CZAJKA, ADRIAN (Mil. Public Museum) Herpetology, Conservation & Departments of Conservation.

All 50 state departments of conservation were polled via questionnaire to determine: (1) how many (if any) of their staff members they considered herpetologists and their educational backgrounds (2) if the departments estimated populations of amphibians or reptiles and if so were these only species of economic importance or "endangered" species (3) if they planned to utilize their staff to study populations of amphibians and reptiles or hire new personnel with backgrounds in herpetology.

The answers were compiled and analyzed. The results will be presented and a discussion of potential conservation approaches, problems and implications is solicited.

PARKER, WILLIAM S., and WILLIAM S. BROWN (Univ. of Utah). Species composition and man-induced changes in a complex of snake hibernacula in northern Utah.

Five complexes of snake hibernacula along 4.5 km of the Stansbury Mtns. are used by four snake species: rattlesnake (Crotalus viridis lutosus), racer (Coluber constrictor mormon), whipsnake (Masticophis t. taeniatus), and gopher snake (Pituophis melanoleucus desorticola). Seven hibernacula of two complexes 650 m apart were studied intensively in 1971 and 1972. Whipsnakes and rattlesnakes seem restricted to specific dens in a complex and are completely absent from several hibernacula. In contrast, racers and gopher snakes occur in all dens and are the only species in some. One particular den studied since 1940 provides data on long-term changes. In 1950, rattlesnakes and whipsnakes (232, 185) were the abundant species, but declined by 1966 (51, 82) and continued to decline through 1971 (15, 48). Racers and gopher snakes increased from negligible numbers in 1950 to 64 + 10 in 1966 and 158 + 36 in 1971. Total snake biomass in this den has been reduced from ca. 73 kg in 1950 to ca. 25 kg in 1971. Human predation may be responsible for the dramatic reduction in numbers of rattlesnakes and whipsnakes since 1950. Recruitment of racers and gopher snakes from adjacent dens in the complex may account for their increase.

RICKRODE, THOMAS, CHARLES F. MUELLER AND DAVID TAYLOR. (Slippery Rock—State College)

Fatty acid composition of the dermal secretions of Plethodon cinereus.

Twenty-four different methyl esters were found in the dermal secretions of Plethodon cinereus by means of gas liquid partitioning chromatography. Fifteen of the twenty-four methyl esters have been identified by comparison with twenty-two standards. Myristate (8.9%), palmitate (11.7%), oleate (10.2%) and stearate (8.3%) were present in the largest percentages. Eight methyl esters each comprised less than one percent of the total sample. Seventy percent of total methylated fat was identified. Future work will center on the determination of the existence of free fatty acids in the dermal secretions and identification of the unidentified methyl esters.

ROSSMAN, DOUGLAS A. (La. St. U.), W. GARY EBERLE (La. St. U.), SHOU-HSIAN MAO (Nat. Defense Med. Center, Taiwan), HEBERT C. DESSAUER (La. St. U. Med. Center), and EDMOND V. MALNATE (Phila. Acad. Sci.). Relationships of the water snakes (genus Natrix): A progress report.

Previously reported evidence from transferrins indicated the existence of at least 3 distinctive species groups. Karyotypic data substantiate these findings. Asian species are characterized by 2N=42 (FN=48), 6 pairs of acrocentrics, 3 pairs of meta- or submetacentrics, and 12 pairs of microchromosomes. In this respect they appear to be somewhat closer to other Asian natricine genera such as Xenochrophis and Rhabdophis than to either European or North American Natrix, both of which have considerably reduced, although rather dissimilar, chromosome complements [Europe: 2N=34 (FN=50), 8 pairs of meta- or submetacentrics, and 9 pairs of microchromosomes; North America: 2N=36 (FN=72), and 18 pairs of meta- or submetacentrics]. North American Natrix have a karyotype identical with that of the other 8 New World natricine genera, which implies a very close relationship among them--certainly a closer relationship than these Natrix share with their Old World congeners. Karyotypic and transferrin evidence pointing to the generic separation of North American, European, and Asian Natrix, is supported by certain features of the hemipenis and scutellation. Although transferrin and karyotypic data are not yet available for African Natrix, osteological, hemipenial, and scale characteristics indicate that this group also is quite distinctive.

TAYLOR, DOUGLAS H. and KRAIG ADLER. (Miami University and Univ. Notre Dame). Shoreline imprinting in the tiger salamander (Ambystoma tigrinum).

Tiger salamanders trained in aquatic tanks with a shoreline at one end exhibited a Y-axis orientation when tested in circular test arenas open only to celestial cues. As larvae they moved on a compass course which would have returned them to deep water had they been in the training tank. Upon metamorphosis, their orientation shifted by 180 degrees (toward land had they been in the training tank). Salamanders trained as larvae but transferred from the training tank to shoreless circular wading pools shielded from celestial cues, but under a normal photoperiod, continued to shift their orientational responses by 180 degrees upon metamorphosis. This indicates a learning process (possibly imprinting) which is unaffected by the gross physiological and structural changes taking place during metamorphosis.

THUROW, GORDON R. (Western Ill. Univ.). Salamander intraspecific and interspecific territoriality and social dominance, and their significance for interspecies competition.

Salamander territoriality was clearly described once, in 1955, for terrarium animals. Published suspicions of field occurrence followed. Amphibian social dominance hierarchy has been reported, but only as calling sequence in breeding male frogs. In this study, Plethodon glutinosus, P. ouachitae, and P. caddoensis were placed in terraria, individually identified, and observed for months and years. Display, challenge or threat, attack, and appeasement behavior were observed in males, females, and immatures. Many poses and movements were used as communication between, as well as within, the three species. Territoriality and social dominance have significance in interspecies competition here, since food and shelter uses overlap. In Oklahoma and Arkansas, P. glutinosus is sympatric with both P. ouachitae and P. caddoensis. Feeding competition and shelter-object competition were observed between these species pairs, and even differential survival between P. glutinosus and P. ouachitae. Plethodon glutinosus appears to be the newer animal in sympatric areas, and has less restrictive habitat requirements. Since dominance is mainly by size, the largest species, P. glutinosus, appears to have the advantage. Two short films illustrate some of the behavior.

WERNER, J. KIRWIN. (No. Mich. Univ.). Geographic variation in muscle proteins from Cynops sp. in Japan and the Ryukyu Islands.

A geographic comparison of muscle proteins as resolved by disc electrophoresis was made between populations of Cynops pyrrhogaster on Honshu and Kyushu, Japan and Cynops ensicauda from Amami-Oshima and Okinawa, Ryukyu Islands. Although closely related but disjunct populations on Honshu could not be differentiated, inter-island populations were easily distinguishable. Qualitative and quantitative variation in proteins within a single population was evident throughout, but did not override the use of the technique as a systematic tool. The electrophoretic patterns indicated a much greater concordance between the two southern island populations of Amami-Oshima and Okinawa and their distinctiveness from the northern island populations. The differences are discussed relative to the origins of Cynops in Japan and the Ryukyu Islands.

WILEY, EDWARD O. (Sam Houston St. Univ.). The Pleistocene herpetofauna of Dark Canyon Cave, New Mexico.

Dark Canyon Cave, located 10 miles southwest of Carlsbad, New Mexico, has yielded a varied herpetofauna of Late Wisconsian age. Included in the collection were five species of amphibians and twelve species of reptiles. The species represented were: Ambystoma tigrinum, Bufo woodhousei, Bufo compactilis, Rana pipiens, Rana catesbeiana, Phrynosoma douglassi, Sceloporus sp., Crotaphytus collaris, Elaphe gutatta, Pituophis sp., Lampropeltis sp., Arizona elegans, Coluber or Masticophis, Natrix sp., Thamnophis sp., Crotalus atrox, and Agkistrodon (?). The only species not found in the area of the cave today are Phrynosoma douglassi and Agkistrodon. The fossil assemblage is composed of two distinct groups. The first, which includes A. tigrinum, the ranids, Natrix, and Thamnophis, is characteristic of a lake side or stream enviroment. The second, which includes the bufonids, the other colubrid snakes, Crotalus atrox, and the lizards is characteristic of an arid, sandy or rocky habitat. Mixtures of species from different habitats in cave fossil assemblages could be expected if deposition were the result of the actions of wide ranging preditors.

YARKEY, ALEXANDER. (Louisiana State Univ.) Comparative cranial myology of North American natricine snakes.

All muscles examined show considerable individual variation in proportional characters. However, some absolute morphological differences are seen in the origin of the medial mandibular adductor and depressor mandibulae muscles. These differences are not uniformly consistent with currently recognized intrageneric groupings. Myological data from juveniles indicate considerable variation in allometric growth at the intra- and intergeneric levels. A levator anguli oris muscle is present in nearly all natricines, but it varies considerably. The assumption that the presence of this muscle is a primitive characteristic is questionable, and caution should be exercised about giving it much phylogenetic importance. An alternative suggestion is that this muscle evolved independently in several taxa and its development has been suppressed in many stocks. The origin and relative position of the levator anguli oris vary substantially from one taxon to another, and its anatomical homology is far from clear. It appears that the general trend of cranial musculature in the natricines has little to offer in tracing evolution at the species or generic level.

WORTHINGTON, RICHARD D. (Univ. Texas El Paso). Density, growth rates and home range sizes of Phrynosoma cornutum in southern Dona Ana County, New Mexico.

In the summers of 1970-1972, horned lizards, Phrynosoma cornutum, were studied in a Larrea-Yucca community near Anapra, Dona Ana Co., New Mexico. In July, 1971, the density was 1.64 individuals per hectare. Preliminary data on home range size revealed large home ranges measuring up to 1.08 ha (minimum polygon method). Hatchlings were first seen in the fall and were found to increase in s-v length at a rate of 0.6 mm/day during their first summer. Lizards larger than 90 mm s-v showed little subsequent growth.

ZUG, G. (Natl. Mus. Nat. Hist.), E. LINDGREN (Wildlife Laboratory, PNG), and J. PIPPET (Wildlife Laboratory, PNG). Ecological observations on Bufo marinus in Papua-New Guinea.

Bufo marinus, the marine toad, has been purposely and fortuitously introduced on many of the South Pacific islands. These toads are extremely abundant in the Port Moresby area and have enabled us to examine, in an elementary way, the population dynamics and dispersal ability of this introduced species. The current distribution and relative abundance in different habitats of marinus indicate that it can only invade successfully natural occurring grasslands or savannahs and man-disturbed habitats. Rainforest appears to be a barrier to dispersal. Although individuals along the margin of the rainforest are larger and have an insectivorous diet, their density is extremely low. In contrast, the marinus density in eucalyptus savannah is high, but the toads are smaller and omnivorous.



REPRODUCTION IN CAPTIVE TRANS-PECOS RATSNAKES, Elaphe subocularis

Although various species of the snake genus Elaphe are commonly bred in captivity, few records exist on the breeding of Elaphe subocularis, which has a restricted range in the southwestern United States and northern Mexico (Dowling, 1957). An instance of captive breeding is reported.

A male E. subocularis (total length 112 cm) was placed in an exhibit with a female (total length 140 cm) on 28 March 1971. The enclosure measured 38 cm x 54 cm x 92 cm. An aquarium gravel substrate was used and rocks and bark were arranged to provide cover for the snakes. The male was from an unknown locality and had been in captivity for only two weeks. The female had been collected one mile north of Big Bend National Park entrance on Highway 385, Brewster Co., Texas, on 24 June 1966. No breeding activity was ever observed and it is thought that mating occurred during the night. On 29 May, the female last accepted food, although previously the snake had been feeding regularly. On 8 July, an egg was laid at 1:00 PM. Five more eggs were laid during the day of 9 July, and the following day one egg was found during the routine morning check. All of the eggs appeared soft and leathery; however, four had an off-white and somewhat yellowish color. The other three eggs were bright white. A description of the eggs is presented in Table I.

TABLE I. Dimensions and Weights of Seven Elaphe subocularis eggs.

Egg	Width	Length	Weight	Color
1	3.0 cm	5.0 cm	27.7 gm	yellow
2	2.9	5.6	29.1	white
3	2.9	5.1	27.3	yellow
4	2.8	5.9	30.4	yellow
5	2.7	5.7	29.3	white
6	2.7	5.2	23.8	yellow
7	2.7	4.8	23.0	white

The eggs were incubated in plastic bags of approximately one gallon capacity sealed at the top with rubber bands, as described by Zweifel (1961). A mixture of Vermiculite (expanded gypsum) and water in the ratio of 1 oz. by weight to 1 fluid oz. of water was used as the incubating medium. The eggs were completely covered. The temperature inside the bags was allowed to fluctuate daily between 24 and 30 degrees C (75 and 86 degrees F). The bags were opened once a week to check the appearance of the eggs and to freshen the air.

On 19 July, egg #4 was removed and opened. The contents inside were solidified and yellowish. On 24 July, the six remaining eggs were noticeably beginning to "sweat" and a slight reddish discoloration was visible on top. On 15 August, eggs 1, 3, and 6 were discarded as they had become discolored and shriveled. On dissection they appeared the same as egg #4. Although weekly feeding had resumed several weeks after egg laying, the female E. subocularis, which had been in captivity for over five years, had died unexpectedly on 13 August.

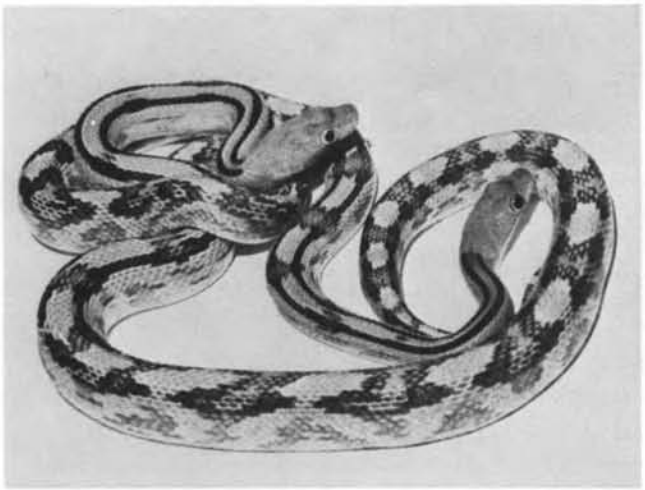
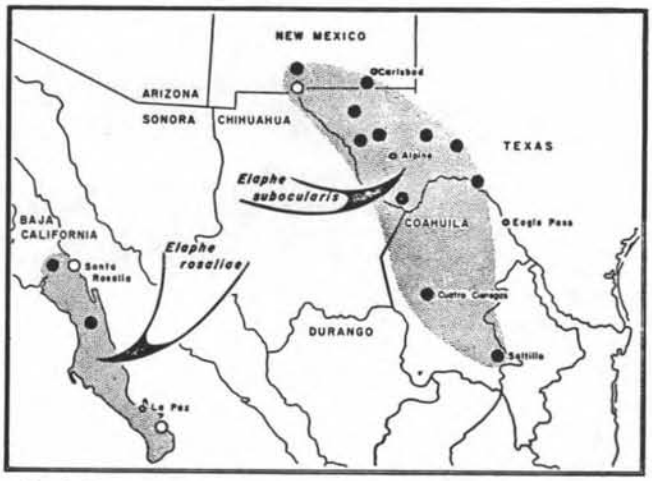


FIG. 1. Two juvenile individuals of Elaphe subocularis eight months after hatching.

On 23 September, after a period of 86 days, egg #2 hatched. Three days later, on 26 September, egg #7 hatched. The remaining egg #5 was opened on 27 September and found to contain a dead, deformed embryo. The patterns and coloration of these juveniles conformed fairly well with the description given by Dial (1965).

The lengths and weights of the two viable snakes on the dates of their respective hatchings are presented in Table II.



MAP 1. Known geographic distribution of the two members of the Rosaliae Section. Solid spots indicate specimens examined; open circles, literature records. Shaded areas show the general regions from which specimens have been taken and are not intended as predictions as to the actual limits of the ranges of these species.

(From Dowling, 1957.)



FIG. 2. Juvenile individual of Elaphe subocularis eight months after hatching. Scale in centimeters.

TABLE II. Weights and Lengths of Hatchlings of Two E. subocularis.

	Weight	Length
#2	14.7 gm	28 cm
#7	13.8 gm	29 cm

Both of the young snakes shed ten days after hatching, on the third and sixth of October, and began feeding on newborn mice on 13 October. After this date they were fed one small mouse each per week. On 25 May 1972 their weights and lengths had increased as presented in Table III.

TABLE III. Weights and Lengths of Juveniles Eight Months after Hatching.

	Weight	Length
#2	31.2 gm	42 cm
#7	28.7 gm	34 cm

I am indebted to the staff of the Fort Worth Zoological Park for helpful comments in preparing this article.

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PRODUCTS MENTIONED IN TEXT

Vermiculite: Manufactured by W. R. Grace & Co., Cambridge, Mass.

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THE STRIPED MUD TURTLE (KINOSTERNON BAURI GARMAN) IN SOUTH CAROLINA

Michael Duever

A collection of mud turtles from the Atomic Energy Commission Savannah River Plant (SRP) near Aiken, South Carolina included several individuals of the striped mud turtle (Kinosternon bauri). This species has not been recorded outside of Florida until recently, when it was found along the south Georgia coast (Wharton and Howard, 1971). The SRP collection contains 56 common mud turtles (Kinosternon subrubrum) and 5 other mud turtles which show characteristics typical of K. bauri. Harry W. Freeman (pers. comm.) collected 20 of these specimens between 1952 and 1957, including one juvenile K. bauri. I collected the remaining 41 specimens between 1965 and 1968, four of which are K. bauri. Freeman's specimens are presently in the collection of the Charleston Museum, and mine are in the collection of the University of Georgia Museum of Zoology.

Uzzell and Schwartz (1955) described K. bauri as having a carapace coloration varying from an almost uniform light brown (unpigmented) to one that is dark brown, with or without three distinct light dorsal lines. The dorsal lines are virtually indiscernible in the unpigmented forms, and lightened areas marking the positions of the underlying bony sutures may be visible through the unpigmented laminae. They describe the head coloration as a varying from gray to black, with or without sharply-defined canthal and angular stripes. Of the five K. bauri from the SRP, one adult female (UG 2405) has three poorly-developed shell stripes, while two individuals (UG 2406-2407) have only a poorly-developed mid-dorsal stripe. The other two individuals (UG 2404 and CM 211), including the juvenile, have no shell stripes. All have light brown shells with lighter areas indicating the positions of the bony sutures. The head pattern on all five individuals is composed of distinct canthal and angular stripes on a predominately black background.

The SRP K. subrubrum show no indication of shell stripes. The head pattern varies and, in a few cases, approaches that of K. bauri. Examination of the head patterns of the 56 K. subrubrum reveal what appear to be four major types: no yellow (1 individual), scattered head spots (33 individuals), angular head stripe with few-to-many head spots (13 individuals), and elongate head spots (9 individuals). Thus there appears to be a continuum between these two species of mud turtles so far as head and shell striping characteristics are concerned. In an effort to further differentiate these two populations of mud turtles, a number of shell measurements were made including carapace length and width, and shell height. A comparison of the proportions of all combinations of these measurements showed no distinct differences between species.

Kinosternon bauri on the SRP is restricted to the bald cypress-tupelo gum swamps bordering the Savannah River, while K. subrubrum is widely distributed in all aquatic habitats. Despite the distance involved, the presence of K. bauri is not unexpected since the lowland habitats and herpetofauna (Duever, 1967) found on the SRP have much in common with those of northern and central Florida.

ACKNOWLEDGEMENTS

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HERPETOLOGICAL ASSOCIATIONS AND SOCIETIES

Compiled by Itzchak Gilboa

Since the publication of the revised list in HR 4(3):77, the following organizations have come to our attention.

CALGARY HERPETOLOGICAL SOCIETY, c/o George B. Pendlebury, 820 - 5th Ave., S.W. no 203, Calgary 1, Alberta, CANADA

CANADIAN HERPETOLOGISTS' SOCIETY, c/o Lubomyr Luciuk, 68 Nelson St., Kingston, Ontario, CANADA

INTERNATIONAL AQUARIUM TERRARIUM CLUB, Box 264, Fort Erie, Ontario, CANADA

NEW ZEALAND HERPETOLOGICAL SOCIETY, c/o Dennis Keall, 14 Glen Rd., Stokes Valley, New Zealand

UNIONE ERPETOLOGICA ITALIANA, Via Ulisse Aldrovandi 18, Museo Civico di Zoologia, 00197 Roma, ITALY

Corrections and emendations will, of course, be greatly appreciated.

UNIONE ERPETOLOGICA ITALIANA

The "Unione Erpetologica Italiana" (Italian Herpetological Union) was founded in September 1967 by Avv. A. Grimaldi and Count A. Pallavicini with the purpose of obtaining from Institutes and Museums, as an Association, those species of reptiles and amphibians which, as private individuals, they had never succeeded in acquiring, and to obtain permits to import exotic species. At the end of 1968 the Union numbered 18 Associates, all Romans, who concentrated mainly on keeping, breeding, and observing captive reptiles and amphibians.

In 1968 Silvio Bruno joined the Union and regular meetings among Associates began to be held in his home. During this period the number of Associates grew to 46. After both Founder Members passed away in the winter of 1970, the Union moved to new quarters in the Museum of Zoology, thanks to the generosity of the Administration of the Zoological Garden of Rome. Here the Union initiated activities on a wider national scale, including the publication of an Information Bulletin.

Today, the number of Italian members has grown to 170 and the Bulletin is visible in most institutes of zoology, natural history museums, and in private and public institutions and cultural associations interested in natural history and nature conservation both in Italy and abroad. The aim of the Union today is to contribute with studies, research, publications, and other activities, to the increase of interest in herpetology and its problems in Italy, and to gather a large number of interested herpetologists with whose help it will be possible to give proper attention to the rich Italian herpetological fauna. The Union publishes an information Bulletin printed in offset three times a year, with an annual total of 100 pages, as well as special subject monographic issues.

Members, in addition to receiving all publications of the Union and to having the right to publish all their interesting observations in the Bulletin, have the advantage of obtaining, for reimbursement of expenses, live reptiles and amphibians from all over the world. They can also obtain books, prints, and postcards of herpetological subjects, as well as being able to attend conferences, movies, meetings, herpetological trips, and eco-ethological studies. The Union endeavours to create herpetological refuges in favourable locations, seeking the collaboration of the respective owners, in order to protect the species of reptiles and amphibians which live in habitats of particular interest and subject to little or no alteration by man.

The address of the Association is: Unione Erpetological Italiana, Via Ulisse Aldrovandi 18, Museo Civico di Zoologia, 00197, ROMA.

JOINT CONSERVATION COMMITTEE ESTABLISHED

Ecological crises affecting populations and even entire species of reptiles and amphibians, or significant portions of their habitat, are increasing in frequency at an alarming rate. As pressures from human population growth inexorably increase, with resulting environmental pollution and degradation, these crises can only increase in both frequency and severity. The recent establishment of a conservation committee by the Herpetologists' League, paralleling similar action by the Society for the Study of Amphibians and Reptiles, is an important event. The members of both committees are herpetologists with great expertise and experience in conservation matters, and we are certain that the herpetological community can look forward to wise counsel and sound leadership in the field of conservation.

We recognize, however, that most conservation problems will be of concern to the members of both societies, and that mobilization of the greatest possible amount of support will be essential for success in environmental warfare. Therefore, we have asked the members of these two committees to coordinate their activities, and to function as a JOINT CONSERVATION COMMITTEE. We hope that there will be full and free communication between all committee members on matters of common interest, and that this will provide a broad base for any general appeal for support or action in the field of herpetological conservation.

Recent experience suggests that immediate and voluminous publicity and free flow of information are the keys to stalling or reversing environmental crises. To open a channel for information flow, both to the Joint Committee and to the members of the societies, we have asked Bruce Bury to serve as Conservation Editor for Herpetological Review. We hope that the members of HL and SSAR will take every opportunity to communicate information of importance in the conservation field to the Joint Committee, for general dissemination to the societies and for action by the members.

T. Paul Maslin, President
Herpetologists' League

C. J. McCoy, Chairman
SSAR

Members of the Joint Conservation Committee:

HL Members: R. Bruce Bury, Laurence M. Hardy, Glenn R. Stewart

SSAR Members: Glenn Gentry, N. Bayard Green, M. Graham Netting

REPTILES, AMPHIBIANS, AND THE LAW

H. Bernard Bechtel and Elizabeth Bechtel

There are a considerable number of local, state, and national laws pertaining to reptiles and amphibians. These laws are, or should be, of interest to herpetologists, and herpetologists ought to be aware of existing legislation pertaining to their special interests. With the present concern about deterioration of the environment and the depletion of wildlife and wildlife habitat to the point that some reptiles and amphibians are endangered as a species, this appears to be a timely opportunity to bring together the known legislation in one compact form. It will also prove a base line against which to compare the changing legislation as other laws are enacted or existing laws are amended or repealed. Furthermore, with passing time, there is more protective legislation and the field biologist, with the rapid and simple access to collecting sites in all parts of America, should have a convenient place to familiarize himself with the laws so that he may avoid breaking the law and so that he may make arrangements ahead of time for such things as obtaining needed collecting permits.

This preliminary listing, for publication in the HERPETOLOGICAL REVIEW, is merely to acquaint the readers with a scope of the laws which presently exist. It is contemplated that a completed paper, with the information in a complete form, will be published in the 1972 YEARBOOK OF HERPETOLOGY. This preliminary listing will give the readers a chance to acquaint the authors with laws which have been omitted and which may be of significance. The amassing of these laws is somewhat hit-and-miss, as there must be innumerable local regulations pertaining to such things as venomous reptiles in captivity, selling of reptiles to minors, keeping reptiles in the home, and cruelty to animals. These can be added to the final paper as they are brought to the attention of the authors and authenticated.

The following listing is not meant to include the reproduction of any laws. It is merely an overview of existing legislation.

ALABAMA

All Animals. All animals are protected in Wildlife Management Areas.

Alligator (Alligator mississipiensis). Alligators are classified as game animals, with no open season.

ALASKA

ARIZONA

Bullfrog (Rana catesbeiana). The taking of bullfrogs is regulated under the Arizona Fishing and Reptile Regulations.

Amphibians (except bullfrogs). The taking is regulated under the Arizona Fishing and Reptile Regulations.

Softshell Turtle (Trionyx s. emoryi). The taking is regulated under the Arizona Fishing and Reptile Regulations.

Ridge-nosed Rattlesnake (Crotalus willardi), Twin-spotted Rattlesnake (Crotalus pricei), and Rock Rattlesnake (Crotalus l. klauberi). The taking and possession regulated by the Arizona Game and Fish Department.

Horned Lizards (Phrynosoma) and Desert Tortoise (Gopherus agassizi). Protection and possession limit regulated under the Arizona Fishing and Reptile Regulations.

Gila Monster (Heloderma suspectum). May be killed, captured, or possessed only with special permit from Arizona Game and Fish Department.

Live Wildlife. Capture and possession of live wildlife regulated by the Arizona Game and Fish Department.

ARKANSAS

Frogs. Taking of frogs regulated by the Arkansas Game and Fish Commission.

Turtles. Taking of turtles regulated by the Arkansas Game and Fish Commission.

Alligator (Alligator mississipiensis). Protected.

CALIFORNIA

Frogs. Taking regulated by the Department of Fish and Game.

Endangered Amphibians. Desert Slender Salamander (Batrachoseps aridus), Santa Cruz Long-toed Salamander (Ambystoma macrodactylum croceum). Protected.

Endangered Reptiles. Blunt-nosed Leopard Lizard (Crotaphytus silus) and San Francisco Garter Snake (Thamnophis sirtalis tetrataenia). Protected.

Rare Amphibians. Kern Canyon Slender Salamander (Batrachoseps simatus), Tehachapi Slender Salamander (Batrachoseps stebbinsi), Limestone Salamander (Hydromantes brunus), Shasta Salamander (Hydromantes shastae), Siskiyou Mountain Salamander (Plethodon stormi), and Black Toad (Bufo exsul). Protected.

Rare Reptiles. Southern Rubber Boa (Charina bottae umbratica), Alameda Striped Racer (Masticophis lateralis euryxanthus), and Giant Garter Snake (Thamnophis couchi gigas). Protected.

Desert Tortoise (Gopherus agassizii). Protected. Taking regulated by Fish and Game Code.

Diamond-back Terrapin (Malaclemys). Protected.

COLORADO

CONNECTICUT

Rattlesnake (Crotalus horridus) and Copperhead (Agkistrodon c. mokeson). Towns authorized to enact bounties.

Snakes. Towns authorized to enact ordinances regulating keeping and exhibition of snakes.

DELAWARE

Alligator (Alligator mississipiensis), Crocodile (Crocodylus acutus), and Caiman (Caiman sclerops). Traffic in skins controlled under state endangered species act.

FLORIDA

Frogs. Taking regulated by Florida Fishing Regulations.

Turtles. Taking regulated by Florida Fishing Regulations.

Alligator (Alligator mississipiensis), Crocodile (Crocodylus acutus), and Caiman (Caiman sclerops). Protected.

Pine Barren Tree Frog (Hyla andersoni). Protected.

Indigo Snake (Drymarchon c. couperi). Protected.

Poisonous snakes. Exhibiting and caging regulated by the Florida Game and Fresh Water Fish Commission.

GEORGIA

Alligator (Alligator mississipiensis). Protected.

Sea Turtles. Atlantic Green Turtle (Chelonia m. mydas), Atlantic Hawksbill (Eretmychelys i. imbricata), Atlantic Loggerhead (Caretta c. caretta), Atlantic Ridley (Lepidochelys kempi), and Atlantic Leatherback (Dermochelys c. coriacea). Turtles and eggs protected.

IDAHO

Bullfrog (Rana catesbeiana). Taking regulated by Idaho Fish and Game Department.

ILLINOIS

Frogs. Taking regulated by Illinois Fishing Regulations.

Bullfrog (Rana catesbeiana). Use of firearms banned.

INDIANA

Frogs. Taking regulated by Indiana Hunting and Fishing Regulations.

Turtles. Taking regulated by Indiana Hunting and Fishing Regulations.

IOWA

Frogs. Taking regulated by Iowa Fishing Laws.

Turtles. Taking regulated by Iowa Fishing Laws.

Bullfrog (Rana catesbeiana). Taking regulated by Iowa Fishing Laws.

KANSAS

Bullfrog (Rana catesbeiana). Taking regulated by Kansas Anglers Guide.

KENTUCKY

Frogs. Taking regulated by Kentucky Fishing Regulations.

Salamanders. Taking for bait regulated by Kentucky Fishing Regulations.

Reptiles. Banned for use in religious ceremonies.

LOUISIANA

Frogs. Taking regulated by Louisiana Fishing Regulations.

Diamondback Terrapin (Malaclemys t. pileata). Taking regulated by the Louisiana Fishing Regulations.

Alligator (Alligator mississipiensis). Taking regulated by Louisiana Wildlife and Fisheries Commission.

MAINE

Poisonous Snakes. Possession of poisonous snakes regulated by state law.

MARYLAND

Endangered Species. There is a state endangered species law.

Snapping Turtle (Chelhydra s. serpentina). Taking regulated under an act in the Annotated Code of Maryland.

Terrapins (Malaclemys t. terrapin). Taking regulated under an act in the Annotated Code of Maryland.

Poisonous Snakes and Large Snakes. Keeping and display regulated by a Baltimore City Ordinance.

MASSACHUSETTS

MICHIGAN

Frogs. Taking is regulated by Department of Natural Resources.

Turtles. Taking is regulated by Department of Natural Resources.

MINNESOTA

Frogs. Taking is regulated by Department of Natural Resources.

MISSISSIPPI

Alligator (Alligator mississipiensis). Protected.

Frogs. Taking is regulated by the Game and Fish Commission.

Turtles. Taking is regulated by the Game and Fish Commission.

MISSOURI

Bullfrog (Rana catesbeiana). Taking regulated by rules in Missouri Wildlife Code.

Other Frogs. Taking regulated by rules in Missouri Wildlife Code.

Turtles. Taking regulated by rules in Missouri Wildlife Code.

MONTANA

NEBRASKA

Bullfrog. (Rana catesbeiana). Taking is regulated by the Nebraska Fishing Guide.

NEVADA

Bullfrog. (Rana catesbeiana). Taking is regulated by Nevada Fishing Regulations.

Reptiles. Covered in state legislation regulating maintenance of zoos, menageries, and wild animal collections.

NEW HAMPSHIRE

NEW JERSEY

Reptiles. Covered in state regulations banning cruelty to animals.

NEW MEXICO

Bullfrog. (Rana catesbeiana). Taking is regulated by New Mexico Department of Game and Fish.

NEW YORK

Box Turtle (Terrapene c. carolina), Wood Turtle (Clemmys insculpta), and Bog Turtle (Clemmys muhlenbergi). Protected.

Frogs. Taking is regulated under New York Fishing Regulations.

NORTH CAROLINA

Alligator. (Alligator mississipiensis). Protected.

Green Turtle (Chelonia m. mydas), Hawksbill Turtle (Eretmychelys i. imbricata), Loggerhead Turtle (Caretta c. caretta), and Leatherback Turtle (Dermochelys c. coriacea). Taking of these turtles or their eggs is regulated under the provisions of a North Carolina General Statute.

NORTH DAKOTA

Reptiles and Amphibians. Included under provisions of statewide law concerning humane treatment of animals.

OHIO

Frogs. Taking is regulated by Ohio Fishing Regulations.

Turtles. Taking is regulated by Ohio Fishing Regulations.

OKLAHOMA

OREGON

PENNSYLVANIA

Frogs. Taking is regulated by Pennsylvania Fish Laws.

Turtles. Taking is regulated by Pennsylvania Fish Laws.

RHODE ISLAND

SOUTH CAROLINA

Alligator (Alligator mississipiensis). Protected.

Carolina Diamondback Terrapin (Malaclemys t. centrata). Taking is regulated by state law.

Green Turtle (Chelonia m. mydas), Hawksbill Turtle (Eretmychelys i. imbricata), Loggerhead Turtle (Caretta c. caretta), Ridley Turtle (Lepidochelys kempi), and Leatherback Turtle (Dermochelys c. coriacea). Sale of the turtles or their eggs banned by state law.

SOUTH DAKOTA

Frogs. Taking is regulated by the South Dakota Fishing Regulations.

TENNESSEE

Bullfrog. (Rana catesbeiana). Taking is regulated by the Tennessee Fishing Guide.

Turtles. Taking is regulated by the Tennessee Fishing Guide.

TEXAS

Alligator (Alligator mississipiensis). Protected.

Horned Toads (Phrynosoma). Protected.

Texas Tortoise (Gopherus berlandieri) and Gopher Tortoise (Gopherus polyphemus). Protected.

UTAH

Desert Tortoise (Gopherus agassizi) and Gila Monster (Heloderma suspectum). Under jurisdiction of the Division of Wildlife Resources and may be "protected wildlife."

VERMONT

VIRGINIA

Frogs. Taking is regulated by Virginia Fish and Game Laws.

Turtles. Taking is regulated by Virginia Fish and Game Laws.

Snakes. Display, exhibit, and handling regulated by state code.

Reptiles and Amphibians. Included generally in state code provisions banning cruelty to animals.

WASHINGTON

Bullfrog (Rana catesbeiana). Taking is regulated in the Fish Regulations.

Western Washington Turtles (ALL). Western Pond Turtle (Clemmys mormorata), Painted Turtle (Chrysemys picta), and Pacific Green Turtle (Chelonia m. agassizi). Protected.

Venomous Reptiles. State law upholds right to destroy venomous reptiles.

WEST VIRGINIA

WISCONSIN

Frogs. Taking is regulated by Wisconsin Fishing Regulations.

Turtles. Included with "rough fish" and the taking is regulated by Wisconsin Fishing Regulations.

WYOMING

AMERICAN SAMOA

GUAM

All Reptiles. Included under classification of unprotected wildlife.

HAWAII

All Snakes. Importation prohibited.

PUERTO RICO

VIRGIN ISLANDS

Green Turtle (Chelonia m. mydas), Hawksbill Turtle (Eretmychelys i. imbricata), Loggerhead Turtle (Caretta c. caretta), Ridley Turtle (Lepidochelys kempi), and Leatherback Turtle (Dermochelys c. coriacea). Hunting of female turtles and collecting of turtle eggs regulated by hunting regulations.

UNITED STATES

All Reptiles and Amphibians. Protected in National Parks.

Reptiles and Amphibians (Varying Species As Determined To Be Endangered). Protected under the Endangered Species Conservation Act and the Lacey Act.

ACKNOWLEDGEMENTS

The authors are indebted to Arden H. Brame (Eaton Canyon Nature Center), Frank Groves (Baltimore Zoo), Sherman Minton (Indiana University School of Medicine) and Horace G. Staffort (Michigan Herpetological Society) for correspondence calling attention to legislation affecting reptiles and amphibians.

2101 North Patterson Street
Valdosta, GA 31601



ASIH Resolution No. 3. 1971.

"WHEREAS, continuing environmental deterioration and various forms of exploitation are threatening the survival of increasing numbers of fishes, amphibians, and reptiles; and

"WHEREAS, nearly three hundred species and subspecies of these animals are now considered by the International Union for Conservation of Nature and Natural Resources, and by national and state governments, to be endangered, rare, or depleted; and

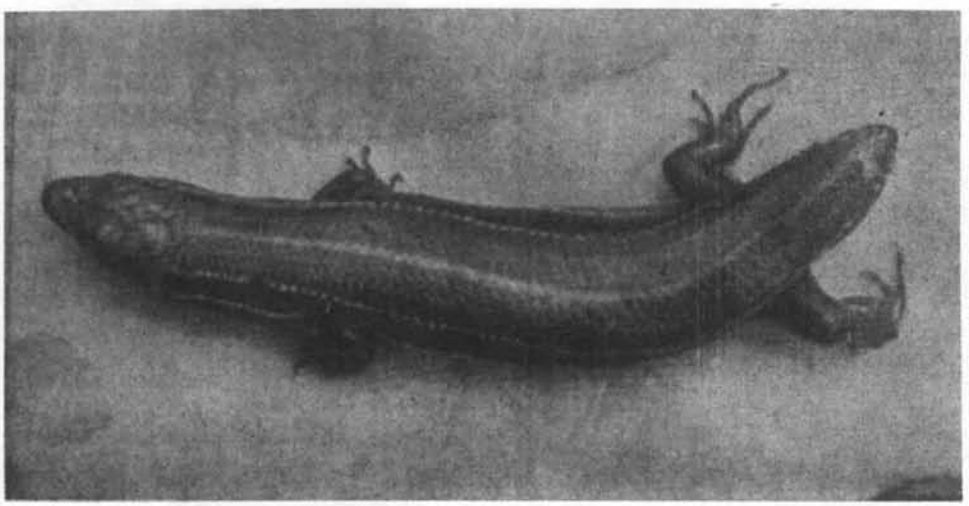
"WHEREAS, there is a growing public awareness of the need to preserve a diversity of animals both to maintain an ecological balance and for their scientific, aesthetic, and economic values; and

"WHEREAS, the American Society of Ichthyologists and Herpetologists is an organization whose members are dedicated to the scientific study of fishes, amphibians, and reptiles; and

"WHEREAS, carelessly conducted studies and a lack of proper concern for the animals of interest to members of this Society may contribute to the depletion or extinction of certain species, subspecies, and populations of these animals; now, therefore,

"BE IT RESOLVED, that the American Society of Ichthyologists and Herpetologists, meeting in Los Angeles, California, June 18, 1971, urges its members to observe the following guidelines on responsibility in the conduct of their research and other professional activities:

1. Sample only enough specimens to satisfy reasonable scientific requirements.
2. Take individuals of species or subspecies believed to be endangered or rare only if such animals are likely to make a substantial contribution to knowledge in the investigator's discipline or to an understanding of the animal's survival.
3. Exercise equal restraint in collecting individuals of species or subspecies, and in taking animals from isolated populations.
4. Deposit collections in museums where they will be properly preserved and available for study by others.
5. Do not over-exploit populations and do not patronize commercial collectors or dealers who regularly keep in stock excessive numbers of unordered specimens or who knowingly sell rare and endangered animals.
6. Make every effort to minimize the impact that collecting and other activities may have on the habitat.
7. Share the results of studies with appropriate state and federal agencies, amateur groups, and other interested people, as well as as with colleagues and students.
8. Seek to promote a conservation ethic among colleagues, students, amateur groups, and others with whom contacts are made.
9. Do not transfer animals from one habitat to another until after careful study has been made of the potential impact on the native biota. Whenever an introduction is made it should be recorded in the public record.
10. Collect only after securing required permits from concerned governmental agencies and/or after permission from the land owner." -- COPEIA 1971(4).



(Press-AP Photo)

IT'S FOR REAL! — This is actually a two-headed skink. The lizard-like creature was found in a driveway in Jacksonville, Fla., this week and an expert at Jacksonville Zoological Society said, while he had heard of such creatures before, both heads were at the same end. When this one tries to run, the legs worked in opposite directions.

The Press, Atlantic City — Saturday, June 3, 1972

When imagination runs away... Skink with partly-regenerated tail. -- HGD.

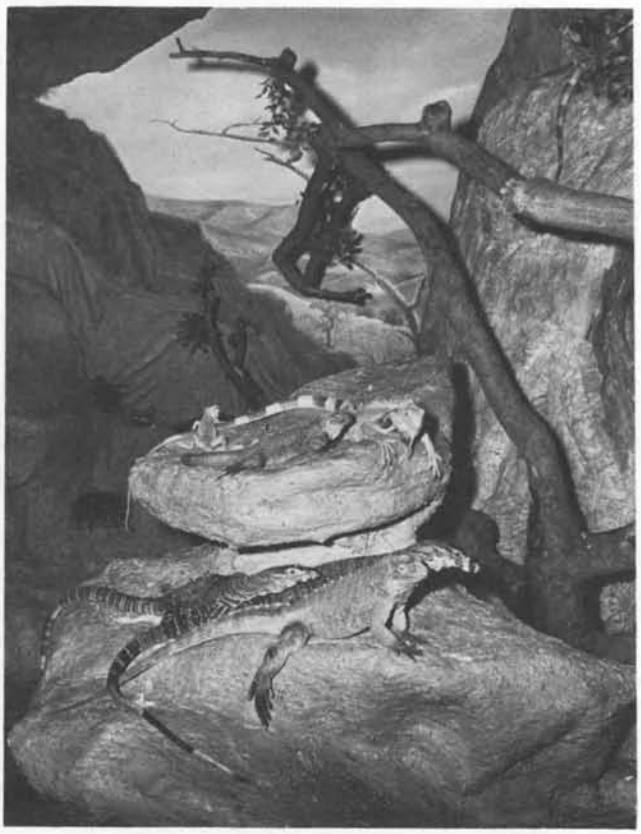


L E F T

The new Reptile House, constructed of cinder blocks, faced with stucco, measures 173 x 126 x 44 feet. Work was begun on the million-dollar building in 1969 and was finished nearly three years later. The two entrances are stone and the roof is made of asbestos shingles and terne metal. The public areas are air-conditioned. Guarding the southern entrance is a statue of a Trachodon, the first dinosaur to be discovered in the United States -- at Haddonfield, New Jersey. It was sculpted by Dexter Jones.

B E L O W

You can't keep a good lizard down -- especially in the new building's large Lizard Exhibit, where the beautifully patterned reptiles spend most of their day climbing the fiberglass rocks. The tree is a real (dead) one with artificial leaves added. Several species of lizards, including iguanas, tegus, and monitors, live side by side with small to medium-sized tortoises. The Exhibit is a replica of a xeric, or desert to semi-arid, region. This enclosure, like the others in the new edifice, is landscaped with remarkable fidelity to correspond with the animals' natural habitat.



THE PHILADELPHIA ZOO'S NEW REPTILE HOUSE OPENS

After more than two years of construction and the installation of dozens of naturalistic habitat settings, most of them of fiberglass, the Philadelphia Zoo's new Reptile House opened to the public on Saturday, March 11. More than 400 specimens, representing 275 species, ranging from a 3-inch banded gecko to an 11-foot, 485-pound American crocodile, are in their new enclosures.

The 89 exhibition areas that house the collection were designed and prepared by the Zoo's Exhibits Department, under the direction of Kenneth D. Dills. One of the highlights of the new building is the Tropical River Exhibit, home of a dozen crocodiles. This includes a big ceiba tree and masses of tropical vegetation, a waterfall, and a realistic replica of a thunder shower, complete with thunder, lightning, gradually increasing darkness, frog calls, wind, mist, and rain. The thunder shower is electronically controlled and takes place several times on each busy day.

The building, which cost more than $1,000,000 to construct, was made possible in large part by a grant of $800,000 from the City of Philadelphia under its Capital Improvement Program.

WASHINGTON MEETING

of the

HERPETOLOGISTS' LEAGUE

28 - 29 DECEMBER 1972

CALL FOR PAPERS

Papers on any herpetological subject are welcome. We would prefer that papers presented orally refer to work in progress or nearing completion. Presentation of results that have been published or that are in press usually are a waste of time for both author and audience.

Ordinarily we would expect an author to present no more than one paper, nor to request more than 15 minutes for its presentation. Exceptions will be considered, however.

An abstract of no more than 200 words must accompany this form to qualify for inclusion in the program (see other side). If an abstract is not received, the paper will be treated as a "title only" contribution.

PLEASE NOTE THE DEADLINE: 1 OCTOBER 1972
(SEE OTHER SIDE FOR ADDRESS)

(PLEASE PRINT OR TYPE)

TITLE: _____

_____

AUTHOR(S): _____

_____

COMPLETE MAILING ADDRESS OF THE FIRST AUTHOR:

_____

_____

TIME REQUIRED: _____ minutes.

EQUIPMENT NEEDED: 2x2" SLIDE PROJECTOR _____
16 MM MOVIE PROJECTOR _____
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CATEGORY IN WHICH YOUR PAPER SHOULD BE PLACED: Anatomy ( ); Behavior ( ); General Ecology & Life History ( ); Genetics & Populations ( ); Physiology ( ); Techniques ( ); Systematics, Evolution, or Zoogeography ( ); Other ( ).

Is presentation of a paper a requirement for your attendance at the meeting? _____. If yes, does this mean that you will not receive funds or time for travel if your paper is not on the program? _____.

HERPETOL REV 4(4): A AUGUST 1972

A B S T R A C T F O R M

Please type the final copy of your abstract in the form provided below. Use the format indicated in the sample: AUTHOR(S) in capitol letters; (institution) abbreviated in parens; and title. The allotted space is adequate for a 200-word abstract.



USE A CLEAN TYPEWRITER AND GOOD RIBBON. This copy will be offset directly for the published abstract.

An abstract is an abbreviated, accurate representation of a presentation. Make the abstract as informative as possible, so that readers may decide, quickly and accurately, whether they need to obtain additional information. Do not include information given in the title. State the purpose, methods, results, and conclusions, either in that order or with initial emphasis on findings (results and conclusions). Make sure that the taxa of the animals studied are indicated either in the title or the abstract.

Make the abstract self-contained, since it must be intelligible without further information. Be concise without being obscure; retain the basic information and tone of the presentation.

Write most abstracts in a single paragraph. Normally employ complete, connected sentences, active verbs, and the third person. Use nontextual material such as short tables and structural formulas only when no acceptable alternative exists. Employ standard nomenclature, or define unfamiliar terms, abbreviations, and symbols the first time they occur in the abstract.

[Adapted from, "Proposed American National Standard for Writing Abstracts." International Council of Scientific Unions Abstracting Board. -- HGD.]

AUTHOR(S):

TITLE:

ABSTRACT:

PLEASE CUT ALONG THIS LINE — SEND ENTIRE PAGE

SEND YOUR ABSTRACT (by 1 October) direct to:

Irene Palser
HERPETOLOGICAL INFORMATION SEARCH SYSTEMS
American Museum of Natural History
New York, N. Y. 10024

ORDER FORM

CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

TO: HENRI C. SEIBERT
SSAR Publications Secretary
Department of Zoology
Ohio University
Athens, Ohio 45701

NAME _____ ORDER NO. _____

ADDRESS _____

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The Catalogue of American Amphibians and Reptiles is a series of loose-leaf accounts, each prepared by an expert in the field. The pages are 8 1/2 x 11 inches, and are punched for standard binders. Each one- to four-page account gives a wealth of information about the animal, including common and scientific names (with a synonymy), a definition, a description, information on fossil occurrence, a detailed map of geographic distribution, and a comprehensive introduction to the literature.

The Catalogue is an essential reference for all biologists who use amphibians or reptiles in their research. The loose-leaf format allows individual additions and up-dating, as well as giving the user the option of arranging the accounts in serial, alphabetic, geographic, or taxonomic order.

One hundred twenty-five accounts were published from 1963 - 1971. Another 25 are to be published in 1972. Most of the accounts are on species that occur in the United States and Canada. Because most of the salamanders of this region have been treated in past issues, future accounts will have greater emphasis on frogs and various reptile groups.

PRICE LIST

	INDIVIDUAL	INSTITUTION
THE CATALOGUE: Imprinted Binder, Taxonomic Tabs, Accounts 1 - 125	$22.00	$27.00
IMPRINTED POST BINDER	6.00	6.00
SYSTEMATIC TABS (Ten tabs to fit Binder: "Class Amphibia," "Order Caudata," etc.).	1.50	1.50
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Make out check to "CAT. AMER. AMPHIB. REPT."
Send check and entire sheet to address above.

SOCIETY MEMBERSHIPS AND SUBSCRIPTIONS

Though their numbers are increasing, it is still true that fewer than 60 per cent of the members of the HERPETOLOGISTS' LEAGUE belong also to the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES. And less than two-thirds of the members of the latter society also belong to the Herpetologists' League. We believe that each of the societies has something important and unique to offer the members of the other. In the interests of a greater combined membership of persons interested in amphibians and reptiles, we invite the members of each society to also join the other.

To ease this process, we offer the "easy-form" membership applications below.

THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

This young society (a 1967 outgrowth of the OHIO HERPETOLOGICAL SOCIETY) offers a number of different publications on amphibians and reptiles.

Its regular publications include the semi-annual JOURNAL OF HERPETOLOGY (about 200 pages per year), the bi-monthly HERPETOLOGICAL REVIEW (about 225 pages per year), and a series of FACSIMILE REPRINTS IN HERPETOLOGY, which is now devoted to reprints of G. A. Boulenger's contributions to American herpetology (about 100 pages per year). In 1971 the Society also assumed sponsorship of the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES. Besides these publications, the Societv issues a number of SPECIAL REPRINTS each year.

Membership is open to anyone interested in amphibians and reptiles. All classes of members receive the J HERPETOL, HERPETOL REV, regular issues of FACSIMILE REPRINTS, and all have the same membership privileges. The higher classes of membership aid the Society in improving and expanding its services to its members and to the field of herpetology.

MEMBERSHIP APPLICATION

Date:_____

TO: Henri C. Seibert, Treasurer, SSAR
Department of Zoology
Ohio University
Athens, OH 45701

Please place my name on the 1972 mailing list as a member of the following class:

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[ ] Contributing member..... 15.00

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[ ] Individual's subscription to the CATALOGUE.....$ 5.00
[ ] Separate subscription to HERPETOLOGICAL REVIEW only.....$ 5.00

TOTAL AMOUNT ENCLOSED..... $_____
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THE HERPETOLOGISTS' LEAGUE

The Herpetologists' League is the elder and the larger of the two societies. It was established in 1936, when the journal HERPETOLOGICA (now in its 27th Volume) began publication.

HERPETOLOGICA appears quarterly, and will publish some 500 pages of papers on amphibians and reptiles this year. By arrangement with the SSAR, the Members and Fellows of the League also receive HERPETOLOGICAL REVIEW.

Anyone with an interest in herpetology is eligible for membership in the Herpetologists' League. The Fellows, who hold the voting rights in the League, are elected by the Executive Council, "on the basis of their contribution to the science of herpetology."

The Members receive HERPETOLOGICA, to which they can submit manuscripts for publication. They may also attend the Annual Meeting, which usually is held in conjunction with the AAAS meetings.

MEMBERSHIP APPLICATION

Date:_____

TO: Hobart F. Landreth
Secretary - Treasurer
Herpetologists' League
Oklahoma City Zoo - Univ. Oklahoma
Rural Route #1, Box 478
Oklahoma City, OK 73111

[ ] Please place my name on the 1972 mailing list as a Member of the Herpetologists' League..... $8.00

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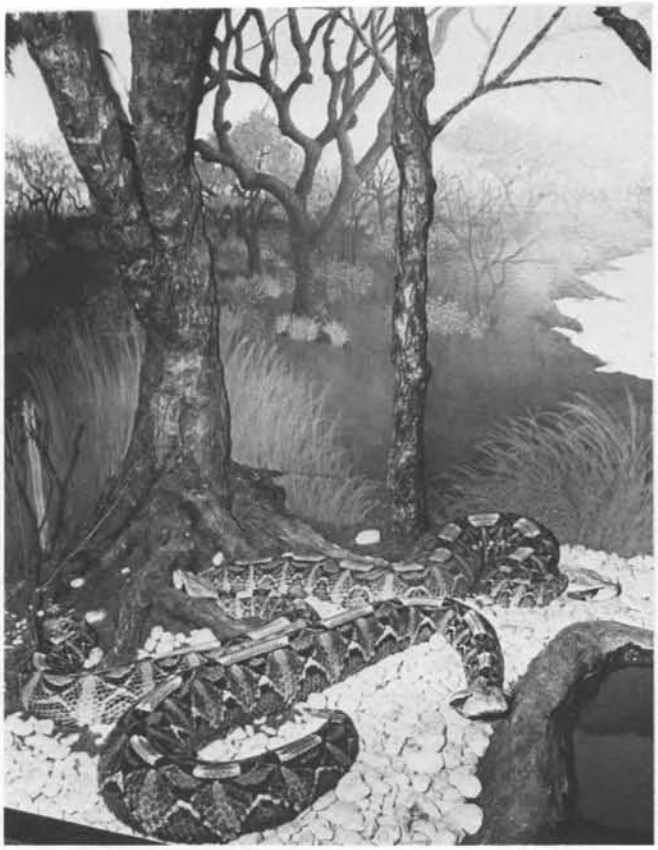
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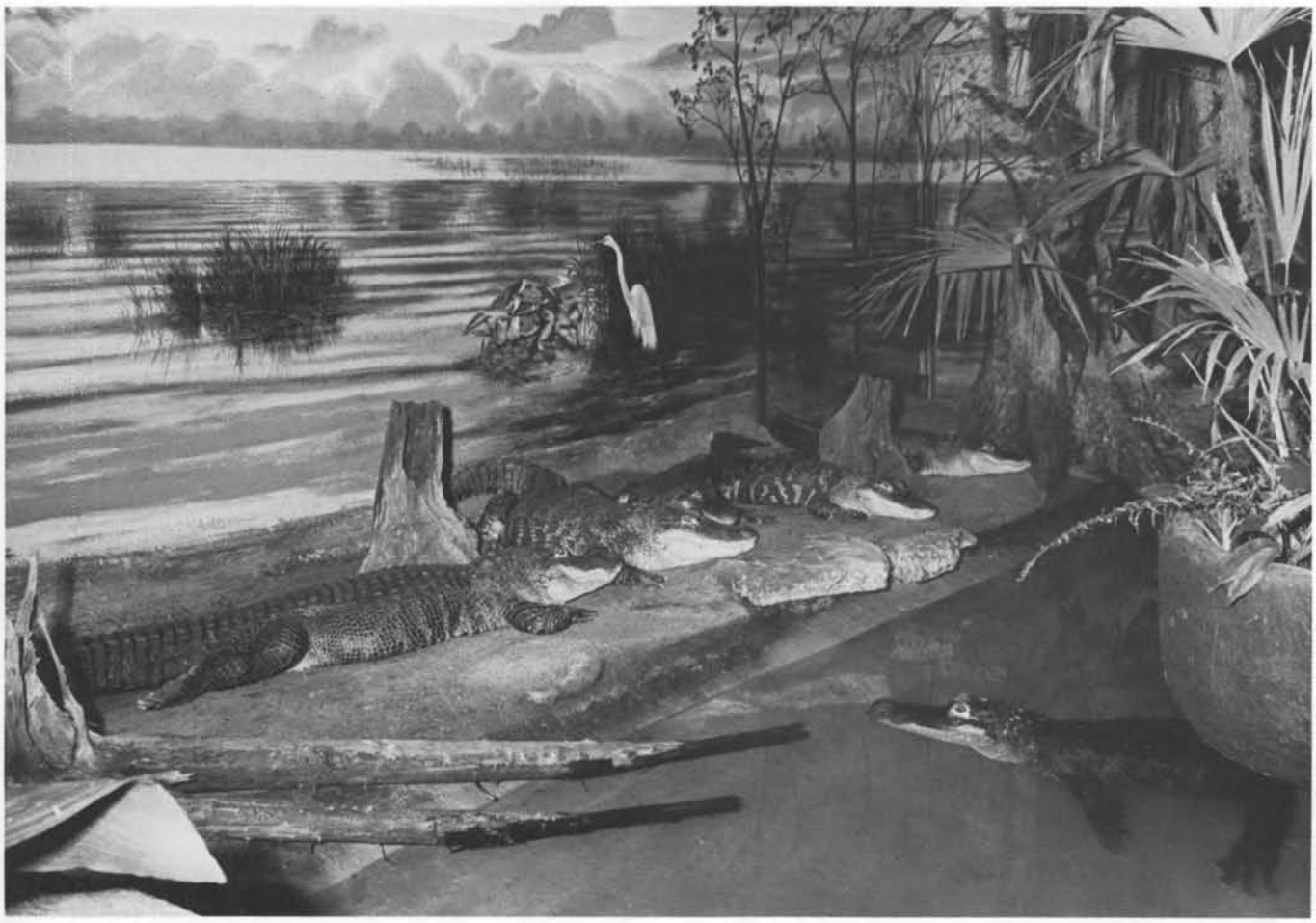
R I G H T

The East African Savanna is the home of these three highly venomous Gaboon vipers. The temperature is kept at 80 degrees and the water between 78 degrees and 80 degrees. All the new exhibits have ventilation to allow the air to circulate. A giraffe would not find the leaves on the vipers' acacia tree very tasty, even though they serve as its principal food in Africa. As real as it seems, the tree is made of fiberglass and polyester resin.



B E L O W

Nine American alligators have a new home in which to loll--the Florida Everglades Exhibit (pictured) in the new Reptile House. The enclosure is a replica of the alligators' natural habitat and has been stocked with live plants indigenous to the area. The heron painted on the wall by the Zoo's Exhibits Department is also found in the Everglades. Eventually, shore birds will be joining these reptiles in their new home. Twice a week, the 'gators are fed a diet of horsemeat, rodents and mackerel, with vitamin and mineral supplements.



CURRENT HERPETOLOGICAL TITLES, XXI: 1971 - 1972

Herpetological Information Search Systems
American Museum of Natural History
New York, New York 10024

We have brought to your attention more than 16,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and more than 1000 through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, etc. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. A complete list of the journals covered by us is published in Herpetol. Yearb. 1971. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1971-1972) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be more current than the previous quarterly issues allowed.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 1 April 1972 through 31 May 1972. HR is computer printed and because of necessary production procedures there is a possibility that on occasion the titles from a single issue of a journal may appear in several issues of HR. Periodical title abbreviations follow the International List of Periodical Title Word Abbreviations (based on the Amer. Nat. Standards Comm. Z39.) (Chemical Abstracts Service, Columbus, Ohio, US.).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and M. Coxe. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

This is contribution Number 40 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

HERPETOLOGICAL
INFORMATION
SEARCH
SYSTEMS



HISS proposes to continue publication of "Current Herpetological Titles" after the present supporting NSF grant expires in December. However, neither the SSAR nor the Herpetologists' League (and perhaps no unified society) can fully support this portion of the HISS program, which is basic to its other operations. It probably will be necessary, therefore, for HISS to charge individual subscriptions of $10 or $15 in order to continue this service (see the description of coverage in the introductory section on this page).

WE have never assumed that herpetologists or their societies would pay more than a portion of HISS's $100,000 annual budget, but they must give substantial indication of their interest for it to seem worthwhile for us to seek the outside funds necessary for continuing.

WE anticipate that HISS services and publications might produce one-quarter of the budget in 1972, and perhaps one-half of it in 1973. In order to achieve these financial goals, however, we must have more subscriptions to our publications and services, as well as donations of funds from institutions and individuals.

Therefore, we encourage all who feel that the HISS operation should continue to support it both by letter (to HGD) and by subscription to at least one of its several publications and services (see page 156).

H. G. Dowling
HISS Director



- A -

ABDULALI,HUMAYUN
1971. A snake-frog incident. (on Coluber rhodorhachis? vs. Rana cyanophlyctis).
J BOMBAY NATUR HIST SOC 68(2):463.

AKAIKE,NORIO
1971. The origin of the basal cell potential in frog corneal epithelium.
J PHYSIOL (CAMBRIDGE) 219(1):57-75.

AKTAN,FETHI
1971. On the Varanus griseus Daud. from southeastern Anatolia.
TURK BIYOL DERG 21:106-117, 8 fig. (Turk, Engl summ).

ALEXANDRE,H.
1971. Etude de la radiosensibilite du metabolisme energetique au cours de la segmentation et de la gastrulation d'embryons de Batraciens.
ARCH INT PHYSIOL BIOCHIM 79(5):1009-1011.

ALONSO-BEDATE,M., A.FRAILE, J.L.LOPEZ-GORDO and C.CALLE
1971. Action of progesterone on the maturation and ovulation of Discoglossus pictus oocytes (Amphibia Anura): results obtained in vivo and in vitro.
ACTA EMBRYOL EXP (3):177-186, 4 fig., 3 tab.

ANANIEVA,N.B.
1971. Summer diurnal activity cycles of desert lizard (Eremias, Sauria) from the southern Balkhash area.
ZBIRN PRATS ZOOL MUS (34):88-93, 5 fig.
(Russ, Engl summ).

ANDREU,GUSTAVO CASAS
1971. National and regional reports: Mexico (on sea turtles).
IUCN PUBL (N.S.) (31):41-44.

ANON
1971. Mud - turtle.
KOREAN NAT (23):15.

ANON
1971. (On protection of tortoises in south Australia).
WILDLIFE AUST 8(4):127-128.

ANON
1971. Reptilia inventory.
CHEYENNE MT ZOOL PARK ANNU REP 1970:42-46.

ARAUJO,P.
1971. Considerations on the second larval moult of snake Ascaridia.
ANN PARASITOL HUM COMP 46(5):605-612, 15 fig.
(Fr, Engl summ).

AUBERT,X.
1971. Influence de la repetition sur la forme et sur la thermogenese de la secousse du muscle sartorius de grenouille.
J PHYSIOL (PARIS) 63(6):160A.

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BACON,P.R.
1971. Sea turtles in Trinidad and Tobago.
IUCN PUBL (N.S.) (31):79-83, 1 fig.

BERGER,LESZEK
1971. Viability, sex and morphology of F2 generation within forms of Rana esculenta complex.
ZOOL POL 21(4):345-393, 8 fig., 11 tab.

BOEHME,WOLFGANG
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HERPETOL REV 3(2):32 (abstr).

BOGDANOV,YU.F. and E.N.ANTROPOVA
1971. Delayed termination of nuclear histone doubling after premeiotic DNA synthesis in Triturus vulgaris male meiosis.
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BOICE,ROBERT and RICHARD C.WILLIAMS
1971. Competitive feeding behaviour of Rana pipiens and Rana clamitans.
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BOURQUIN,O., JOHN VINCENT and P.M.HITCHINS
1971. The vertebrates of the Hluhluwe Game Reserve - corridor (state-land) - Umfolozi Game Reserve complex.
LAMMERGEYER (14):5-58, 61 fig.

BOURRET,REINE L., C.LEOTY, G.RAYMOND and A.BESSEAU
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(Fr, Engl summ).

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1971. The evolutionary significance of learning.
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1971. Ocean records of turtles (North Atlantic Ocean).
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BRUSCHELLI,GIOVANNA MIGLIORINI and GABRIELLA ROSI
1971. Polymelia induced by vitamin A in embryos of Bufo vulgaris.
RIV BIOL 64(3-4):279-283, 1 fig. (Ital 271-278).

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1971. Responses to chemical stimuli of prey in newly hatched snakes of the genus Elaphe.
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BUSTUOABAD,O. and A.PISANO
1971. Explant of the first four micromeres of Bufo arenarum eggs.
ACTA EMBRYOL EXP (3):225-237, 10 fig., 1 tab.

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CAILLE,J. and D.GARNIER
1971. Etude en conditions de courants constants des reponses contractiles de la fibre musculaire squelettique rapide de grenouille.
J PHYSIOL (PARIS) 63(6):180A-181A.

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SYESIS 4(1-2):217-222, 6 fig.

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CEDRINI,LUIGI and ALDO FASOLO
1971. Olfactory attractants in sex recognition of the crested newt. An electrophysiological research.
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CHABRECK,ROBERT H.
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CHESNAIS,J.M., E.CORABOEUF, M.P.SAUVIAT and J.M.VASSAS
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1971. Action neuromusculaire comparee du venin de Naja nigricollis et de la neurotoxine (a-Najatoxine) qui en est extraite.
ARCH INT PHARMACODYN THER 192(1):26-38, 8 fig.
(Engl summ).

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1971. The snakes of Greece.
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1971. Noteworthy locality records for some Louisiana reptiles.
BULL PHILAD HERPETOL SOC 19:15-16, 1 fig.

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1971. Agamen, pp. 207-229, IN, B.Grzimek, Grzimeks Tierleben: Enzyklopaedie des Tierreiches. Vol. 6. Kriechtiere. Kindler Verlag, Zurich.

DAVAL,G., J.LEVETEAU and P.MAC LEOD
1971. Analyse factorielle de la reponse olfactive peripherique chez la grenouille.
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1971. Further comparative observations on the morphology and cytochemistry of the urinary bladder of Chelonia.
ARCH ITAL ANAT EMBRIOL 76(2):127-138, 8 fig. (Ital, Engl summ).

DEL FOSSE,ERNEST and FRED H.WHITTAKER
1971. Helminth parasites of the newt Notophthalmus viridescens in Meade County, Kentucky.
TRANS KY ACAD SCI 32(3-4):75.

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1971. Electrocardiographic abnormalities in decerebrate frogs.
INDIAN J MED RES 59(11):1827-1833, 4 fig., 1 tab.

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1971. The crocodile. 15 pp., illus. (mimeo).

DIJK,D.E.VAN
1971. Anuran ecology in relation particularly to oviposition and development out of water.
ZOOL AFR 6(1):119-132, 3 fig.

DIJK,D.E.VAN
1971. A further contribution to the systematics of southern African anuran tadpoles - the genus Bufo.
ANN NATAL MUS 21(1):71-76, 2 fig., 1 tab.

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ZOOL AFR 6(1):85-117, 14 fig., 3 tab.

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1971. Miniature marksmen. (on Chameleons).
ANIMALS (LONDON) 13(18):826-827, illus.

DORST,JEAN
1971. Elevage de tortues en captivite.
NOTIC GALAPAGOS (17):18.

DUFF-MACKAY,A.
1971. A new Hyperolius (Amphibia Anura) from Kenya.
J EAST AFR NATUR HIST SOC CORYNDON MUS 29(128):1-3, illus.

DUGUET,MICHEL, JEAN-PIERRE CHAUVET and ROGER ACHER
1971. Reptilian hemoglobins: N-terminal sequence of an alpha-chain of viper (Vipera aspis) hemoglobin.
FEBS LETT 18(2):185-188, 2 fig., 1 tab.

DUNSON,WILLIAM A. and GARY W.EHLERT
1971. Effects of temperature, salinity, and surface water flow on distribution of the sea snake Pelamis.
LIMNOL OCEANOGR 16(6):845-853, 4 fig., 2 tab.

DUPONT,W.
1971. Controle de l'activite corticotrope de l'hypophyse par l'hypothalamus, chez la grenouille verte, Rana esculenta L.
J PHYSIOL (PARIS) 63(6):204A-205A.

DURAND,JACQUES PIERRE
1971. Recherches sur l'appareil visuel du protee, Proteus anguinus Laurenti, urodele hypoge.
ANN SPELEOL 26(3):497-525, 2 fig., 2 pl. (Engl abstr).

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EISELT,JOSEF
1971. Eirenis rechingeri n. sp. (Colubridae, Serpentes) aus dem Iran.
ANN NATURHIST MUS WEIN 75:375-38., 1 tab., 2 pl.

EISELT,JOSEF and JOSEF F.SCHMIDTLER
1971. Vorlaeufige Mitteilung ueber zwei neue Subspezies von Amphibia salientia aus dem Iran.
ANN NATURHIST MUS WEIN 75:383-385.

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1971. (Review of) Snakes of Nyasaland, by R.C.H.Sweeney, 1971.
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1971. (Review of) The tailed amphibians of Europe, by J. W. Steward, 1969.
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1971. Summary of information on progress in captive culture techniques made by "Mariculture".
IUCN PUBL (N.S.) (31):90-91.

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1971. Notes on South Carolina salamanders.
J ELISHA MITCHELL SCI SOC 87(4):206-208, 1 tab.

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1971. Trasmissione sperimentale di trematodi nell'anatra (Anas platyrhynchus domesticus) con girini di Rana esculenta.
PARASSITOLOGIA 13(1-2):177-181, 1 tab. (Engl summ).

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1971. Glattechsen, pp. 246-265, IN, B.Grzimek, Grzimeks Tierleben: Enzyklopaedie des Tierreiches. Vol. 6. Kriechtiere. Kindler Verlag, Zurich.

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GABE,MANFRED and HUBERT SAINT GIRONS
1971. Polymorphisme des glandes nasales externes des Sauriens.
C R ACAD SCI (PARIS) D 272:1275-1278, 1 tab.

GAFFNEY,EUGENE S.
1971. Chelonia.
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1971. Die Doppelschleichen, pp. 339-345, IN, B.Grzimek, Grzimeks Tierleben: Enzyklopaedie des Tierreiches. Vol. 6. Kriechtiere. Kindler Verlag, Zurich.

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1971. Respirometria, valore emoglobinico e tasso di ormoni tiroidei in Triturus cristatus ambientato a temperature diverse.
BOLL SOC ITAL BIOL SPER 47(19):568-571, 3 tab.

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1971. Ecology of fish and turtles in a reservoir receiving thermal effluent from a nuclear reactor.
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1971. Flore et faune malgaches: originalite - protection.
SCI NATUR (106):25-29, illus.

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1971. Le rapport de la chaleur de recouvrement acrobique a la chaleur initiale dans le sartorius de crapaud.
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1971. A model of early amphibian development.
SYMP SOC EXP BIOL 25:417-428, 2 fig.

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1971. Some aspects and problems of the use and exploitation of marine turtles.
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1971. Geckos, pp. 154-174, IN, B.Grzimke, Grzimeks Tierleben: Enzyklopaedie des Tierreiches. Vol. 6. Kriechtiere. Kindler Verlag, Zurich.

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1971. Die Schlangen, pp. 346-361, IN, B.Grzimek, Grzimeks Tierleben: Enzyklopaedie des Tierreiches. Vol. 6. Kriechtiere. Kindler Verlag, Zurich.

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(Engl summ).

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FIELDIANA - ZOOL 58(7):83-91, 6 fig.

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1971. Mating calls of some frogs from Thailand.
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PROC JAP ACAD 47(2):225-230, 2 fig.

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EXPERIENTIA (BASEL) 27:851-852, 3 fig. (Engl summ).

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1971. Action de la thyroxine exogene sur l'epithelium intestinal de la larve d'un amphibien anoure, Discoglossus pictus Otth.
J MICROSC 12(2):205-224, 1 fig., 9 pl. (Engl summ).

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For 1971*.....	15	12
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*Problems of compilation have delayed publication of this first issue. It will appear soon.

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FORMAT. Manuscripts should be type-written on white bond paper, one side only. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and the animal group(s) included. Use standard abbreviations for journals.

The 1971 YEARBOOK OF HERPETOLOGY (published by HISS) contains a list of American Standard abbreviations for some 2,500 journals. Other publications that will be of assistance in the preparation of manuscripts are:

CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES (see information on this page).

Common names for North American amphibians and reptiles (COPEIA 1956(3): 172-185).

SCIENTIFIC WRITING FOR GRADUATE STUDENTS, by F. Peter Woodford (Rockefeller Univ. Press, New York, NY 10021). $5.75.

STYLE MANUAL FOR BIOLOGICAL JOURNALS (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, DC 20016). $3.00.

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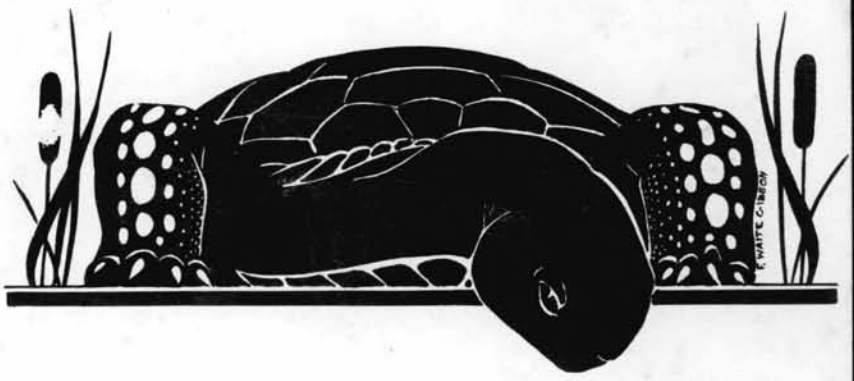
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VOLUME 4, NUMBER 3
JUNE 1972

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Produced for the

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Herpetological Review

VOLUME 4, NUMBER 3

JUNE 1972

NEWS AND ANNOUNCEMENTS

74 Calendar and News.

75 CORRIGENDA.

77 Herpetological Societies: 1972.

84 Harry Greene introduces the LIFE HISTORY PAGE.

93 Harvey Pough introduces PHYSIOLOGICAL MISCELLANEA.

DEPARTMENTS

76 REGIONAL SOCIETIES: Establishment of the EASTERN SEABOARD HERPETOLOGICAL LEAGUE.

81 CONSERVATION: Schuierer reports the status of Bufo exul.

82 CARIBBEAN RESEARCH.

REPORTS

83 More on lizard home ranges, by William Milstead.

85 Ambystoma burrowing, by Gruberg & Stirling.

90 On a synonym of Gastrophryne usta, by Craig Nelson.

GEOGRAPHIC DISTRIBUTION

91 Arizona records, by Hahn & May.

93 New records of Ambystoma texanum, Eumeces anthracinus, Graptemys geographica, and Hemidactylus palaichthus.

94 CURRENT HERPETOLOGICAL TITLES, XX: 1971-1972.

SOCIETY NOTES

78 SSAR Treasurer's report for 1971.

80 Report of the December meeting of SSAR Governors.
Appointments to SSAR Miscellaneous Publications Committee.
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EDITORIAL

With this issue we will have published 120 pages in HERPETOLOGICAL REVIEW this year -- and I have had to hold back an additional six pages of material to restrict this to a 40-page issue. Thus, there appears to be little question that HR is fulfilling a need in the field.

There seems to be little question either that CURRENT HERPETOLOGICAL TITLES will be separately published next year (assuming that its publication is continued), and that it will cost something extra. The few returns that the editorial in HR 4(2) occasioned have been very favorable, but we will need to hear from a larger segment of the community before a decision on continuing can be made (see page 94).

PHYSIOLOGICAL MISCELLANEA makes its debut in this issue, with a description of its aims and the proposed page format by Harvey Pough.

The LIFE HISTORY PAGE also is introduced by Harry Greene, who gives instructions to authors and an example.

These additions give HR six special departments: Regional Societies, Geographic Distribution, Caribbean Research, Physiological Miscellanea, Herpetological Husbandry, and Life History. We hope that members and subscribers will let us know what they think of these departments -- and will contribute to them.

More than anything else, though, HR needs NEWS of what members and their societies are doing. It is very difficult to publish a newsletter without any input of news. -- HGD.

MEETINGS AND SOCIETIES

CALENDAR 1972

18-23 June.....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Boston.

26-29 June.....SALAMANDER SYMPOSIUM, Highlands Biological Station, North Carolina. (BY INVITATION ONLY.)

14-17 August...Combined Meeting: HERPETOLOGISTS' LEAGUE and SOCIETY FOR THE STUDY OF AMPHIBIANS and REPTILES, University of Oklahoma Biological Station, Lake Texoma.

11-15 September....INTERNATIONAL SOCIETY ON TOXINOLOGY, General Meeting, Institute of Organic Chemistry, Darmstadt, West Germany.

24-30 September...INTERNATIONAL CONGRESS OF ZOOLOGY, Monaco.

26-28 December....HERPETOLOGISTS' LEAGUE, Annual Meeting (Cosponsored by the SSAR), Washington, D.C. (with AAAS).

CALENDAR 1973

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, San Jose, Costa Rica.

4-11 August....FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

CALENDAR 1974

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Ottawa, Canada.

INDIVIDUALS AND INSTITUTIONS

MARY L. ALTALO (Smith Coll., Northampton, MA 01060) received the best student paper award from the HERPETOLOGIST'S LEAGUE, for her paper on, "Repression of egg-eating behavior in brooding females of Desmognathus ochrophaeus," presented at the Annual Meeting in December, 1971.

RENE MARQUEZ M. (Apado. Postal 79-04052, Col. Doctores, Mexico 7, D.F.) is now in charge of the "Programa Nacional de Tortugas Marinas," which is concerned with all aspects of sea turtle conservation.

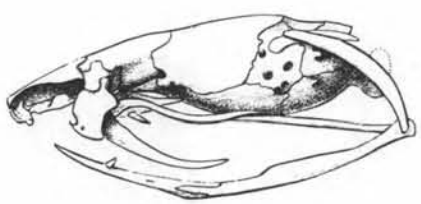
CARL F. KAUFFELD (Director, Staten Island Zoo, 614 Broadway, Staten Island, NY 11514) will continue the longevity records of captive snakes which previously were done by the late Charles E. Shaw of the San Diego Zoo.

KRAIG K. ADLER (Univ. Notre Dame, Notre Dame, IN 46556) will move to Cornell University in the fall. He joins the section on neurobiology and behavior, where there is a group with common interests in animal orientation.

W. FRANK BLAIR (Univ. Texas, Austin, TX 78712) assumed the presidency of the American Institute of Biological Sciences in January).

SHERMAN & MADGE MINTON (Ind. Univ. Sch. Medicine, Indianapolis, IN 46202) have submitted their manuscript on GIANT REPTILES to Scribner's.

MIKAAL P. BEAUDET (Director, Ocean Res. Lab., Seattle, WA 98105) was bitten on the left index finger by an African Burrowing Viper, Atractaspis bibronii, while examining it on 12 March. (Because of this snake's peculiar jaw mechanism, this happens to everyone who attempts to hold Atractaspis behind the head. BE FOREWARNED! -- HGD.)



CORRIGENDA

In HR 3(6) we carried some collation errors in Current Titles. Our apologies to the readers and to the authors.

The titles by:
Brandner, Robert L.
Cooper, John E.
Grogan, William L. Jr.
Hallinger, Scott
Keefer, Thomas
Metrolis, Albert P.
should read BULL MD HERPETOL SOC.

The titles by:
Carroll, Robert L.
Vaugh, Peter Paul
should read J PALEONTOL.

The title by:
Wake, David B.
should read QUART REV BIOL.

Z O O N O O Z

The American Association of Zoo Keepers is a semi-professional society of animal keepers formed to upgrade their job standards and image. Headquartered in San Diego, CA, the AAZK has members in all of the major zoos of the United States and in many foreign parks. Their Northeast Regional Conference was held in New York, last June.

B O O K R E V I E W

REDDELL, JAMES R. and R. W. MITCHELL (Eds.) 1971. Studies on the Cavernicole Fauna of Mexico. BULL ASSOC MEXICAN CAVE STUD 4: 1-239. (Box 7672 University Station, Austin, Texas 78712. $8.00).

Although mainly concerned with invertebrates, this collection of 14 papers contains checklists of cave-associated faunas which include amphibians and reptiles. From caves of the Sierra de el Abra (Tamaulipas and San Luis Potosi), Reddell and Mitchell list records for the anurans Hylactophryne augusti, Syrrophus cystignathoides, S. dennisi and S. longipes; the snake Bothrops atrox asper; and lizards of the genus Lepidophyma. A second paper by the same authors gives locality data for the urodeles Chiropterotriton chondrostega, C. sp., and C. multidentata, Pseudoeurycea belli and P. scandens; the anurans Eleutherodactylus decoratus, Syrrophus longipes, and Rana pipiens; and the snake Rhadinea crassa in the Sierra de Guatemala of Tamaulipas. A third list, "New Records from Southern Mexico," by Reddell, concerns the practically unknown caves of Chiapas, Guerrero, and Veracruz. Recorded are the anurans Hyla staufferi, Plectrohyla ?sagorum, Eleutherodactylus decoratus, Leptodactylus melanotus, Tomodactylus nitidus, and Bufo marinus.

The black-and-white illustrations include photos of Chiropterotriton multidentata, Pseudoeurycea scandens, and P. belli, all from the file of outstanding photos by Bob Mitchell.

JOHN E. COOPER
Executive Vice-President
NATIONAL SPELEOLOGICAL SOCIETY, INC.
Assistant Professor of Biology
COMMUNITY COLLEGE OF BALTIMORE
Baltimore, MD 21215



EASTERN SEABOARD HERPETOLOGICAL LEAGUE: E S H L

It is often relatively easy to found new societies, but relatively difficult to amalgamate them once they have been established. Thus, it is a pleasure to report one success.

In previous issues of HERPETOL. REV. we have reported the activities of the East Coast Herpetological Societies which have a total membership of about 800. Most recently, an active correspondence was initiated between the groups by Bob Tuck (MdHS). This correspondence was labelled "SUPPORT HERPS-ACCORD PROJECT 1972" and was aimed at this region's HERPetological Societies ACting in acCORD. The discussion focused on the advisability and feasibility, and the ways and means of further cooperation and/or amalgamation of various regional groups. Officers of the involved societies have debated the pros and cons of amalgamation-cooperation for some months.

On 23 April 1972, officers and representatives of the participating societies met at the home of Mal and Min Skaroff (PHS), and, after some four hours' debate, formed the EASTERN SEABOARD HERPETOLOGICAL LEAGUE - ESHL. In a festive atmosphere, all those present summarized the primary aims and purposes of ESHL as follows:

1) The PHS, NVHA, MdHS, VHS, CtHS (provisionally), and NYHS shall form a League on the basis of equal representation.
2) The main purpose of ESHL will be to coordinate joint and individual projects involving species of amphibians and reptiles whose ranges extend over areas shared by the various societies. These projects include the protection of rare and endangered species and related areas of concern such as the importation of such species.
3) All members of the participating bodies shall have the opportunity to meet twice yearly, in early March and late October.
4) Herps-Accord will continue as a newsletter, but its circulation will be restricted to officers of the constituent societies.

As a HISS representative, I was gratified that the first action of ESHL was to pledge its support of the HISS bibliographic project, in response to H. G. Dowling's editorial in HERPETOL. REV. 4(2). /We wish to thank ESHL for the offer of monetary support, as well./

Robert G. Tuck, Jr., who chaired this meeting, was unanimously elected Coordinator of ESHL and Margaret M. Thomas (NVHA) was elected Secretary.

The formation of ESHL is the culmination of years of consideration and painstaking negotiations. We congratulate all those involved, and trust that the new League will be of great benefit to the entire herpetological community. /IG/



FIRST ROW: Frances A. Velay (PHS), Robert G. Tuck, Jr. (MdHS), Thomas Moore (NVHA), Malvin L. Skaroff (PHS), John Green, Jr. (PHS). SECOND ROW: I. Gilboa (HISS), Harvey Hance (PHS), Theodore Feuerbach (NVHA), Margaret M. Thomas (NVHA), David Hulmes (NYHS), Pat Hulmes (NYHS), Peter Wemple (MdHS), Robert D. Jenning (VHS), Richard C. Gaskill (CtHS), Joseph Couch (PHS). THIRD ROW: Frank T. Watrous, III. (NVHA), Bill Marvel (MdHS).

Photos by John Robinson (PHS).

HERPETOLOGICAL ASSOCIATIONS AND SOCIETIES

Compiled by Itzchak Gilboa

By popular request, we are again listing the active and semi-active herpetological organizations. If there are 5000 herpetologists around the world at present, they are divided into fifty-three groups. In our last list, in HERPETOL REV 2(3):6-9, in September 1970, we included thirty-two groups. Twenty-nine of those are listed here again, and we have added twenty-four new ones. Our sincere apology is hereby extended for any omissions or oversights. Corrections and emendations will, of course, be greatly appreciated.

AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Div. Reptiles and Amphibians, U.S. Nat. Mus., Washington, DC 20560
ASOCIACION LATINO-AMERICANA DE ICTIOLOGOS Y HERPETOLOGOS, Secretatia Provisional, Inst. Nac. de Microbiol., Avda. Velez Sarsfield 563, Buenos Aires, Argentina
ARIZONA HERPETOLOGICAL ASSOCIATION, c/o Peggy Scheitlin, 2507 E. Devonshire, Phoenix, AZ 85016
AUSTRALIAN SOCIETY OF HERPETOLOGISTS, c/o G. F. Watson, Dept. Zool., Univ. of Melbourne, Parkville, Vic., 3052, Australia
BAY AREA T. & T. CLUB, c/o Connie Maddix, 2332 B. Haste St., Berkeley, CA 94704
BI-STATE T. and T. SOC., Frederick G. Wastholz, 32 Leonon Pkwy., Old Tappan, NJ 07675
BRITISH HERPETOL SOCIETY, Secretary, BHS, c/o Zool. Soc. London, London, N.W. 1, England
BUTTE COUNTY T. & T. ASS., Sean McKeown, Pres., 112 Shasta Hall, Chico, CA 95926
CALIFORNIA TURTLE AND TORTOISE CLUB, P.O. Box 90573, Los Angeles, CA 90045
    WESTCHESTER CHAPTER, Alondra Park Headquarters Bldg., 3850 Manhattan Beach Bl., Lawndale, CA
    FOOTHILL CHAPTER, Glendale Federal (Community Room), 2350 Honolulu Ave., Montrose, CA
CANADIAN AMPHIBIAN & REPTILE CONSERVATION SOC., c/o Miss Barbara Froom, 8 Preston Pl., Toronto 12, Ontario, Canada
CHICAGO HERPETOLOGICAL SOC., Mrs. Hedda Saltz, 7351 N. Winchester, Chicago, IL 60626
CONNECTICUT HERPETOLOGICAL SOC., c/o George T. Vesper, Gracy Rd., Canton, CT 06019
DEUTSCHE GESELLSCHAFT FUER HERPETOLOGIE UND TERRARIENKUNDE, c/o Konrad Klemmer, Senckenberg Museum, Senckenberg-Anlage 25, 6000 Frankfurt am Main 1, Germany
EASTERN SEABOARD HERPETOL LEAGUE, Robert G. Tuck, 5431-56th Ave. No. 3, Riverdale, MD 20840
FLORIDA WEST COAST HERPETOLOGY AND CONSERVATION SOC., c/o Robert W. Marek, 3027 Pine Tree Ave., Largo, FL 33540
FLORISSANT HERPETOLOGICAL SOC., c/o Gary R. Bloyd, 42 Radford Dr., Florissant, MO 63031
FREE STATE HERPETOLOGICAL SOC., c/o Clyde Prince, Box 285, Carter Lane, Elvaton, Millersville, MD 21108
GERMAN SALAMANDER SOCIETY, Walter Sachs, Angerstrasse 8, Buchloe (Allgau), West Germany
GREAT LAKES HERPETOLOGICAL SOCIETY, Geoff Schrock, 11281 W. Outer Dr., Detroit, MI 48223
HERPETOLOGICAL ASSOCIATION OF AFRICA, Secretary-Treasurer, c/o Umtali Museum, Umtali, Rhodesia
HERPETOLOGICAL SOCIETY OF JAPAN, Biol. Lab., Aoyama Gakuin Univ., Shibuyaku, Tokyo, Japan
HERPETOLOGISTS' LEAGUE, Hobart E. Landreth, Okla. Zoo - U. of O., R.R. 1 Box 478, Oklahoma City, OK 73111
INDIANA HERPETOLOGICAL SOC., c/o Garry S. Bryan, 453 N. Grant St., Martinsville, IN 46151
INTERNATIONAL CROCODILIAN SOC., P.O. Box 217, Silver Spring, FL 32688
INTERNATIONAL T. and T. SOC., INC., P.O. Box 45555, Los Angeles, CA 90045
IOWA HERPETOLOGICAL SOC., c/o Henry Wallace, 147 Tonawanda Dr., Des Moines, IA 50312
KENTUCKY HERPETOLOGICAL SOC., c/o Eddie Ashmore, Box #2, 2825 Lexington Rd., Louisville, KY 40206
LONG ISLAND NATURALIST SOC., c/o F. C. Schlauch, 415 Clift St., Central Islip, L.I., NY 11722
MARYLAND HERPETOLOGICAL SOC., c/o Nat. Hist. Soc. of Md., 2643 N. Charles St., Baltimore, MD 21218
MASSACHUSETTS HERPETOLOGICAL SOC., P.O. Box 643, Dorchester, MA 02124
MEMPHIS HERPETOLOGICAL SOCIETY, P.O. Box 11337, Memphis, TN 38111
MICHIGAN SOCIETY OF HERPETOLOGISTS, c/o Horace G. Stafford, 754 West Shepherd St., Charlotte, MI 48813
MISSOURI T. and T. SOC., c/o Jim Selke, 1340 Layven Ave., Florissant, MO 63031
NEDERLANDSE VERENIGUNG VOOR HERPETOLOGIE EN TERRARIUMKUNDE, R. M. Meijer, Zonnestein 119, Amstelveen, Netherlands
NEVADA HERPETOLOGICAL SOC., c/o Bill Cobb Jr., 4909 Eugene Ave., Las Vegas, NV 89108
NEW MEXICO HERPETOLOGICAL SOC., c/o John S. Applegarth, Dept. Biol., Albuquerque, NM 87106
NEW YORK HERPETOLOGICAL SOC., P.O. Box 3946, Grand Central Sta., New York, NY 10017
NEW YORK T. and T. SOC., c/o Martha E. Reeves, The Dial Press, 750 Third Ave., New York, NY 10017
NORTHERN VIRGINIA HERPETOL ASSOC., c/o F. T. Watrous, 1201 S. Court House Rd., Arlington, VA 22204
OREGON INSTITUTE OF HERPETOLOGY, 3675 Madrona Lane, Medford, OR 97501
PACIFIC NORTHWEST HERP. SOC., c/o Ernie Wagner, Woodland Park Zoo, 5400 Phinney Ave., Seattle, WA 98103
PHILADELPHIA HERPETOLOGICAL SOCIETY, 130 East Street Rd., Warminster, PA 18974
PHILADELPHIA T. and T. CLUB, c/o Steven R. Schwartz, 7940 Temple Rd., Philadelphia, PA 19150
SAN DIEGO HERPETOLOGICAL SOCIETY (no address available)
SAN DIEGO T. and T. CLUB, c/o Cary Herrera, 7620 Eads Ave., La Jolla, CA 92037
SERPENT SAFARI HERPETOLOGICAL SOCIETY, c/o Peter Emory, RFD 2, Brewster, NY 10509
SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, c/o Henry C. Seibert, Dept. Zool., Ohio Univ., Athens, OH 45701
SOUTH FLORIDA HERPETOLOGICAL SOCIETY, c/o Ed Chapman, 3490 W. 1st Ave., Hialeah, FL 33012
SOUTHWESTERN HERPETOLOGISTS' SOCIETY, P.O. Box 2054-D, Pasedena, CA 91105
    INLAND EMPIRE BRANCH, c/o Joe Gorman, Dept. Biol., Univ. Redlands, Redlands, CA
    ORANGE COUNTY BRANCH, c/o Randy Limburg, 318 E. Redwood, Orange, CA 92667
    SAN FERNANDO VALLEY BRANCH, c/o Betty Reynolds, 2890 Rock St., Simi, CA 93065
    SAN GABRIEL VALLEY BRANCH, c/o Don Griffith, P.O. Box 2054-D, Pasadena, CA 91105
TENNESSEE HERPETOLOGICAL SOCIETY, Howard Lawler, Pres., 1505 Acklen Ave., Nashville, TN 37212
TEXAS HERPETOLOGICAL SOCIETY, c/o David Gyure, Canyon High Schook, New Braunfels, TX 78130
VIRGINIA HERPETOLOGICAL SOCIETY, 4706 Tallahassee Ave., Rockville, MD 20853
WEST END REPTILE CLUB, c/o Mrs. Toni Siguitan, 2569 Leebe Ave., Pomona, CA 91766



SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

ANNUAL REPORT OF THE TREASURER

January 1, 1971 to December 31, 1971

I N C O M E

SSAR GENERAL FUNDS

Balance from 1970		
Reserve Fund		$ 926.70
Blanchard Fund		150.00
		1076.70
Income during 1971		
Dues and subscriptions		
669 US Members	5369.00	
84 non-US Members	524.56	
194 Institutions	3216.64	
	9110.20	
Contributions		
Sustaining & Contributing	236.25	
Williston reprint	500.00	
Herpetologists' League	1500.00	
Anonymous	100.00	
	2336.25	
Sales		
Journal reprints	887.50	
Herp Review ads & charges	1183.50	
Books	5800.00	
Small facsimiles	317.49	
Back issues	1467.80	
	9656.29	
Interest		380.02
Total receipts for 1971		$21,482.76

SSAR CATALOGUE FUND

Transferred from ASIH	$11,671.22
Transferred from H.G. Dowling	2,123.57
Received by Treasurer	868.50
TOTAL	$14,663.29

EXPENDITURES

SSAR GENERAL FUNDS

Journal of Herpetology		
Copyright		$ 12.00
Printing		4730.26
Table of Contents		76.41
Reprints		130.60
		$4949.27
Herpetological Review		
Mailing permit		45.00
Printing		3383.10
Packing and Mailing		706.49
		4134.59
Book reprints		
Printing (4 books)		4090.33
Composition, etc.		172.65
Ads		73.75
		4336.73
Small facsimiles		
Boulenger, 11, 12, 13, McLain, Boulenger Index, typesetting, etc.		1034.41
		1034.41
Office of Secretary		
Postage		64.60
Xerox		41.14
Telephone		27.26
Ballots		11.87
Letterheads		61.76
Secretarial Assistance		98.61
		305.24
Office of Treasurer		
Refunds		104.00
Bank charges		1.32
Typing		165.31
Bad check		8.00
Telephone		.95
Stationery		78.32
Account Books		3.65
Postage		139.72
Xerox		3.00
		504.27
Office of Publications Secretary		
Postage		293.62
Envelopes and mailers		130.04
Rubber stamp		4.00
		427.66
Office of Assistant Publications Secretary		
Postage		410.88
Secretarial assistance		58.20
Envelopes		25.16
Rubber stamps, string		9.30
		503.54
IBM typewriter (4th installment)		100.00
TOTAL SSAR EXPENDITURES		$16,295.71

SSAR CATALOGUE FUND

Art work	$131.00
Refund	16.00
HISS	1300.00
TOTAL CATALOGUE EXPENDITURES*	$1447.00

* Only since transferred to SSAR. See Dowling's Report to SSAR Catalogue Committee, December 27, 1971, for details on receipts and expenditures for complete year 1971.

SUMMARY

SSAR GENERAL FUNDS

Receipts for 1971	$21,482.76
Expenditures for 1971	16,295.71
Balance	5,187.05

Cash on hand, 1 January 1972, Athens, Ohio - Hocking Valley Bank:

In reserve fund	2,394.50
In Blanchard fund	150.00
Advance subscriptions	4,574.00
Advance book sale	10.00
Life memberships*	4,894.00
Committed funds	12,022.50
Uncommitted funds	3,719.25
Total	$15,741.75

*Life Members:

2 at	$150	=	$ 300.00
24 at	100	=	2400.00
18 at	75	=	1350.00
15 at	50	=	750.00
4 at	25	=	100.00
			4900.00
Foreign exchange			-6.00
			$4894.00

SSAR CATALOGUE FUND

Receipts for 1971	$14,633.29
Expenditures for 1971	1,447.00
Balance	13,216.29

TOTAL CASH ON HAND, Hocking Valley Bank, Athens, Ohio, 1 January 1972, $28,958.04

ASSETS

Publications	Market value
Books	$19,447
Boulenger	3,240
Other small facsimiles	2,926
Journal Ohio Herp. Soc.	2,180
Journal Herpetology	3,766
Herpetological Review	3,162
	$34,721
IBM Typewriter	$500

PROJECTED REVENUE FOR 1972

SSAR GENERAL FUNDS

Dues and subscriptions	
Regular	$5,500
Foreign	500
Institutional	3,500
Contributions	250
Sales	
Books	3,500
Back issues	1,200
Reprints and page charges	2,000
Interest	650
Total Revenue	$17,100
SSAR CATALOGUE	$ 6,409

PROPOSED BUDGETS FOR 1972

SSAR GENERAL FUNDS

Journal of Herpetology	5,000
Herpetological Review	3,150
Large facsimiles	3,200
Small facsimiles	1,100
Secretary	250
Treasurer	500
Publications Secretary	1,500*
Billing Costs	550
Asst. Publications Secretary	200**
IBM Typewriter	100
Annual meeting	200
General Fund	750
Reserve	500
Prize	100
Total	$17,100

* This proportionally large increase is to pay for reprinting several back issues of Herp. Review and for storage charges on our accumulating stock.

** Since the Assistant Publications Secretary will no longer handle the mailing and packaging of the Journal, the budget has been reduced.

SSAR CATALOGUE FUND

Estimated Income	
Subscriptions	
Individual	$3,170
Institutional	1,239
	4,409
Sales	
Back issues	1,500
Tabs, binders, etc.	500
	2,000
Total	$6,409
Proposed Budget	
Preparations	$2,825
Printing	3,150
Distribution	1,030
Miscellaneous	400
	7,405
Capital Expenditures	1,800
Total	$9,205
Deficit for 1972	$2,796

SUBMITTED MARCH 13, 1972
H. C. SEIBERT, TREASURER

R E P O R T
SSAR BOARD MEETING
DECEMBER 1971

The SSAR Board met from 1:00 - 5:00 P.M. on 29 December 1971 at the Philadelphia Zoological Gardens. The results of the recent election was announced with the successful candidates being:

Chairman-elect.....Arden H. Brame
Secretary.....Max A. Nickerson
Treasurer.....Henri Seibert
Director.....James Vial

The joint SSAR - Herpetologist League meeting (14 - 17 August at the University of Oklahoma - Lake Texoma Field Station) was discussed and Dr. Hutchison was named Meeting Chairman. Dr. Diane Secoy was appointed Publications Secretary. All Standing Committees were approved. The functions and costs of HISS services to SSAR were outlined. The ASIH - Herpetological Catalog has been transferred to SSAR and will be managed by the society. The 1971 and 1972 budgets were approved. 1971 was a good year for SSAR as we will end with a remainder of approximately $4,000. The 1972 budget (exclusive of catalog) is $16,800.

The joint Committee report (Dr. Adler) noted no more money in an amalgamated society than two separate societies. Thus talks on amalgamation may proceed on non-financial matters. Dr. Kennedy presented a thorough Editors Report with numerous suggestions. All Appointed Officers were reappointed.

Max A. Nickerson
Secretary

APPOINTMENTS TO
SSAR MISCELLANEOUS PUBLICATIONS COMMITTEE

I am asking the committee for 1971 to accept reappointment for an additional year, ending 31 December 1972. Additionally, I am appointing two new persons in an effort to diversify the committee and make it more representative of the age distribution in the SSAR. Thus, the committee for 1972 is as follows:

EDITORIAL COMMITTEE:

STEPHEN R. EDWARDS, Museum of Natural History, The University of Kansas, Lawrence, KS 66044, USA

PETER J. KAPLAN, 7 Harwich Road, Providence, RI 02906, USA

ROBERT MERTENS, Forschungsinstitut Senckenberg, Senckenberganlage 25, 6 Frankfurt - M 1, GERMANY

P. E. VANZOLINI, Museu de Zoologia, Universidade de Sao Paulo, Caixa Postal 7172, Sao Paulo, BRASIL

RICHARD D. WORTHINGTON, Department of Biological Sciences, University of Texas at El Paso, El Paso, TX 79902, USA

BOULENGER INDEX EDITOR:

JOHN S. APPLEGARTH, Department of Biology, University of New Mexico, Albuquerque, NM 87106, USA

Kraig Adler, Editor

MEMBERS DESIDERATA

B. H. BRATTSTROM and R. PATTERSON (Dept. Biology, California State College, Fullerton, CA 92631) are working on the recent range of the desert tortoise, Gopherus agassizi. We would appreciate any locality records, sites of road kills, and visual sightings.

WILLIAM H. ZOVICKIAN (1200 Burnham St., Colorado Springs, CO 80906) needs adult female radiated tortoises (c. 12") for attempted breeding with his males. Will purchase or trade for good specimens. Will consider trading a male for a female. Please help.

WILLIAM F. FLANIGAN (Sleep Laboratory, Univ. of Chicago, 5741 S. Drexel Ave., Chicago, IL 60637) would like to purchase immediately several live and very large adult black iguanas (Ctenosaura pectinata).

THE CURRENT STATUS OF THE ENDANGERED SPECIES BUFO EXSUL MYERS DEEP SPRINGS VALLEY, INYO COUNTY, CALIFORNIA

Frederick W. Schuierer

ABSTRACT: The current condition of B. exsul appears good when compared to its adult population size in 1962. Collections made by amateur and professional herpetologists may be or may become its biggest threat. It is recommended to: "Let it be!"

In May 1971 members of the Department of Biology of Cabrillo College visited Deep Springs Valley, Inyo County, California, in order to assess the condition of the exile toads, Bufo exsul Myers. This toad along with a few other ectothermal vertebrates has been placed on the endangered species list by the State of California Resources Agency.

Myers (1942) and Schuierer (1962) discussed the uniqueness of this population of toads, and noted their precarious existence.

MATERIALS AND METHODS

Studies in May consisted primarily of estimating the size of the populations of adults and larvae. The toads are concentrated in the south-western portion of Deep Springs Valley where a series of springs irrigate about two hundred acres of suitable toad habitat. Schuierer (1962-1963), divided the toad habitat into the three zones: the springs, their channels, and marshy areas. The region occupied by toads can be further divided into three subsections in terms of the drainages of the springs. The eastern-most toad area is readily accessible to visitors, and presumably most of the collections have occurred here. The central and western regions are not readily seen, and represent a more undisturbed nucleus of the toad population. The concentration of animals varies from place to place and no one technique for population estimation appeared suitable for use throughout the study. Two methods of enumeration were used to estimate the population size of adults. These were a flush-actual count technique along the pond margins, ditches, and sloughs where toads are easily seen, and an area density estimation in the marshes and bogs. It should be noted that some areas in the central and western part of the toads' range consist of dense mats of vegetation interlaced with swamp-like sedge areas. These boggy sites overlay a semi-soft black anaerobic mud, one to three feet thick.

OBSERVATIONS

Our observations in the Spring of 1971 were made during a continuous spectrum of weather conditions which ranged from snowfall on May 27, 1971 to bright, sunny weather with air temperature of 94 degrees F on May 29th. The toads were active during the entire period of time in about the same numbers. Replicate counts do not vary significantly.

With the exception of two bog areas the counts were made by flushing the animals. The area density figure is considered to be low, as only animals actually seen in the rather soggy bog were used in the figure. It is probable that the population is larger than the count indicates.

Several amplexing pairs were noted, and tadpoles of all sizes were observed in all the areas. In May no transformed young were seen. If the size of toads is considered, it would appear that the eastern-most area has smaller, hence younger, animals. This may reflect the "collecting pressure" in this easily accessible region. The tadpoles are concentrated in the shallow marsh area or in quiet water "pools" bordering the sloughs. Three cubic meters of suitable habitat may contain as many as five thousand larvae. Recruitment of larvae to the adult population appears adequate at this time.

DISCUSSION

Currently the population appears to be stable and maintaining itself. The only difference noted when compared to Schuierer (1962 and 1966), is the large proportion of young adults in the eastern and accessible area, which may reflect collecting. Bufo exsul is a unique and protected species. Unsupervised collecting by any persons or groups, professional or amateur, will have a deleterious effect on the population.

Bufo exsul is well adapted to a rigorous environment. It has adjusted to various climatic conditions and periodic droughts, as well as changes in the irrigation pattern of its habitat. The toad can survive transplantation by students within the confines of the Valley, and even the itinerant observer! It is strongly

TABLE 1. Area Count of Bufo exsul Adults

	SLOUGHS	MARSH-PONDS	BOG
EASTERN	526	233	12
CENTRAL	540	315	120*
WESTERN	560	500	1161*

Adult Count Total (Males, females, and juveniles): 3,967

*Based on area density calculation.

suspected, however, that the black toad cannot withstand the collectors, amateurs or professionals, who harvest numbers of adult toads for any reason. The appeal therefore from a guilty fellow biologist is simply, "Let it be!"

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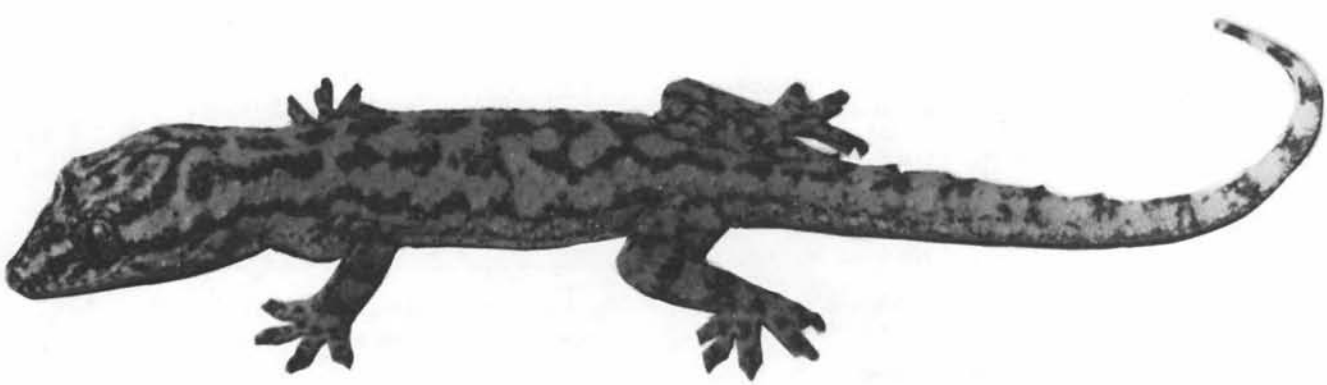
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CARIBBEAN RESEARCH PAGE

HAROLD HEATWOLE (Department of Zoology, University of New England, Armidale, N.S.W., Australia) is continuing work on dispersal and species numbers of amphibians and reptiles on several Caribbean Islands (with Richard Levins). Heatwole is also compiling a check-list and key to the amphibians and reptiles of Puerto Rico and the Virgin Islands, and a complete bibliography of the herps of the Puerto Rico-Virgin Island area.

MARGARET STEWART (Department of Biological Sciences, State University of New York at Albany, Albany, New York 12222) would like to hear from anyone working on Jamaican Eleutherodactylus; present, recent past, or future. She is planning field work there soon, and does not wish to overlap studies in progress.

THOMAS A. WIEWANDT (Langmuir Lab., Cornell Univ.) is on Mona Island, Puerto Rico, beginning a year's investigation of the ecology and behavior of West Indian iguanas of the genus Cyclura.



Hemidactylus palaichthus, USNM 192763, TRINIDAD and TOBAGO, Tobago, St John Parish, Little Tobago (= "Bird-of-Paradise") Island; collected 23 July 1971 by Robert G. Tuck, Jr. at approximately 2030 hrs; photographed by Tuck on 24 July.

MORE ON LIZARD HOME RANGES

William W. Milstead

Turner (1971) has criticized a recent article of mine (Milstead, 1971) in which I stated that all that is needed to measure a two-dimensional home range is some graph paper and a pair of scissors, and he has gone on to present a number of theories of home range measurement to demonstrate that such measurements pose problems that are far from simple. I am in general agreement with Turner, but unfortunately, he has missed my point. My statement was made to emphasize that two-dimensional home ranges are more easily measured than three-dimensional ones, and that some attention needs to be given to this difficulty. Regardless of which theory is used in taking the measurements, a two-dimensional home range is very easily measured once the theory is decided upon. If, for example, one is to use one of the polygon methods, all one has to do is to take his measurements in the field, transfer those measurements to graph paper, cut out the home ranges with a pair of scissors, and convert the areas to square meters by weighing them on an analytical balance in comparison with the known area of a square drawn on the same graph paper.

With a three-dimensional home range, on the other hand, there are no simple techniques -- and for that matter, there are no theories, either. Consider, for example, a lizard with a home range that includes two boulders, three fence posts, and a tree. The polygon methods are the only theories that might possibly carry over from two-dimensional home ranges to this situation, and the water-spray technique I suggested (Milstead, 1971) is thus far the only technique available for measuring it. While it was not my intention to make light of two-dimensional home range measurements, particularly of the various theories concerning those measurements, one must conclude that they are far ahead of the virtually untapped frontier of three-dimensional areas.

In the same article, Turner (1971) goes on to question our reasons for measuring home ranges. One reason suggested is that the size of the home range reflects energy expenditure by the animal. Home range studies are also useful in studies of density per unit area, and in studies of lizard spacing within a given area. For these purposes, the recapture radii (Calhoun and Casby, 1958; Jorgensen and Tanner, 1963; Tinkle, 1967 a,b) and ellipse (Jennrich and Turner, 1969) methods may be the best methods to date, but they are probably poor methods for other types of studies.

Home range, particularly when it is associated with territoriality, is a function of social behavior, and as such is very useful to one studying social organization in a population. I am of the opinion that home range sizes are not genetically inherited as display action patterns appear to be. I believe, instead, that they are environmentally determined by several factors including food availability, and both genetically and environmentally determined by the vigor and aggressiveness of the individual. Thus, in any given population, the largest home ranges would be occupied by the dominant lizards, and a lizard's home range size might reflect its position in the community. In this sense, one of the polygon methods or other methods dealing with the actual points where a lizard is recorded may be more useful than theories which tend to depict a home range as a circle or ellipse. The reason being that lines connecting the actual points of sighting or capture may more accurately show the adjacent home ranges (and animals) with which the animal comes in contact. The recapture radii and ellipse methods would not be as useful because they deal with averages and are also based on two very weak assumptions: (1) animal home ranges are circular or elliptical, and (2) all of the area within the circle or ellipse is suitable for occupancy by the animal. Neither of these is true for animals that live on trees or boulders and they are probably true only rarely for animals living on plane surfaces.

My personal preference is for the minimum polygon methods because of these two reasons and also because a minimum polygon may be all the land that a male of a strongly territorial species can hold. Turner and others have suggested that home ranges tend to continue increasing in size with additional captures, but there is considerable evidence that the ranges actually show a decrease in size as main activity areas become identified. In fact, it has been suggested (Milstead, 1961) that the entire day-to-day activity area of an animal be termed the "home realm," and that the term "home range" be restricted to the smaller area of "usual" activity. Tinkle (1967b) effectively reached the same conclusion, although he applied the term "home range" to the larger area which I called the "home realm".

It should be noted that division of a lizard's activity area into home range and home realm requires a number of observations (recaptures). In my 1961 paper, I attempted to map the two areas for lizards with five or more captures, but was not successful with any except one for which I had 22 observations.

I am grateful to Dr. Donald W. Tinkle for critically reading the manuscript.

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RECENT PUBLICATIONS

MEXICAN REPTILES IN THE SENCKENBERG MUSEUM (15 p.) manuscript list prepared by Harry W. Greene, 1971. Xerox copies available from the Section of Amphibians and Reptiles, Carnegie Museum, Pittsburgh, PA 15213. Price 75¢ (cost), prepaid.

REPTILES OF ISRAEL, Revised and expanded taxonomic list of the reptiles of Israel and its administered areas according to the status on May 31, 1972 (published by the Dept. Zool. Tel-Aviv Univ., 4 pp., 1 fig.). Available free on request from compiler, J. H. Hoofien, c/o B.L.L.B-M., P.O. Box 2, Tel-Aviv, Israel. Residents of Arab countries only, may request the list from HISS.

TOXINS OF ANIMAL AND PLANT ORIGIN, edited by A. de Vries and E. Kochva. 1972. Gordon and Breach Sci. Publ. Inc., London. xv + 489 pp., illus.

LIFE HISTORY PAGE

Many people who collect and study reptiles and amphibians accumulate notes on reproduction, natural food items, etc. which are not suitable for conventional publication. The LIFE HISTORY PAGE is a place for short but noteworthy reports on such topics. The rationale for it is that if this type of information is more readily available it can be of use to others working on comprehensive studies of a particular topic or species.

Information for Contributors

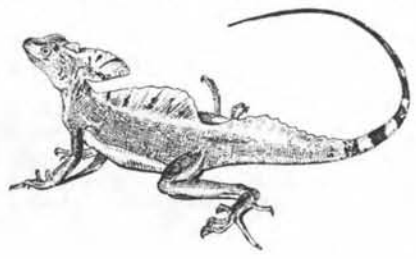
List significant data in concise but complete sentences or in a table when appropriate. Include such things as source and size of females, pertinent dates, duration and conditions of incubation, and number and size of eggs and young. Indicate the location of preserved specimens, and use abbreviations when they are in the author's institution or private collection. Use literature citations and brief comments when necessary to emphasize noteworthy aspects of the data. H. S. Fitch's recent review (1970, Reproductive cycles in lizards and snakes, MISC PUBL UNIV KANSAS MUS NATUR HIST 52) or other relevant summaries will be used in evaluating manuscripts, and they may also be sent to one or more reviewers. Authors will be given an opportunity to approve any necessary changes. -- HWG.

Contributions to this page may be cited as follows:

GLIDEWELL, J. R. 1972. Life history: Basiliscus basiliscus. HERPETOL REV 4(3):84

SAURIA

BASILISCUS BASILISCUS. A nest was found on top of an exposed bluff approximately 30 m above the Rio Puerto Nuevo, 13.7 mi NE Palmar Norte, COSTA RICA, 13 June 1971. Five eggs were under a rock about 20 cm in diameter, in a small burrow 3 cm below the surface. An Ameiva quadrilineatus was in the same burrow. Four eggs hatched 3 November 1971. Measurements at hatching were (snout-vent length, mm; tail length, mm; weight, g): 41, 82, 1.7; 38, 74, 1.3; 39, 75, 1.4; 38, 76, 1.6. Two are catalogued as UTA R-3520 and R-3521. -- JERRY R. GLIDEWELL, Department of Biology, UNIVERSITY OF TEXAS AT ARLINGTON, Arlington, Texas 76010.



OBSERVATIONS ON THE BURROWING HABITS OF THE TIGER SALAMANDER (AMBYSTOMA TIGRINUM)

Edward R. Gruberg and R. Victoria Stirling

We placed several adult tiger salamanders in a 5' x 10' outside enclosure near our laboratory at M.I.T. They spontaneously and unanimously dug burrows into which they entered within a few hours. What follows is a description of salamander burrowing that we observed over the course of two years.

The enclosure had a one-and-one-half foot hill on the north side, and on the south side was a 2' x 3' x 6" deep pond filled with running tap water sufficient to maintain a more or less constant level.

All animals were placed in the enclosure during the day. Some were put in the pond, and others were placed on land. They followed idiosyncratic initial courses. Some made a movement in a particular direction, then started to make complete burrows (described below). Others circumnavigated the enclosure several times, making a few feeble initial attempts at burrowing at different spots. Others moved in and out of the pond a few times over two to three hours before burrowing.

The actual burrowing is stereotyped. The animal finds a suitable spot, often with an overhanging branch or stone. One forelimb digs, using quick backward thrusts and short recovering strokes. During digging, soil is often thrown into the air. The opposite forelimb may take over after 3 to 10 cycles; this changeover is sometimes accompanied by a reversal of the hind limb positions (similar to that observed in freely walking salamanders). When sufficient soil is piled up around the animal's trunk, the forelimbs often stop digging, and the hind limbs plow the soil backwards. They are alternately swung forward and powerfully retracted. During the forelimb digging, the position of the animal's body does not change much. When the forelimbs and hindlimbs change over, the body is thrown into a flexed position, and the nose pushes laterally at the sides of the burrow. The head movement does not occur during hindlimb plowing. Thus, slow but steady progress is made, and with pauses of from a few seconds to half a minute the salamander burrows, completely covering itself in 10 to 20 minutes. If the burrow is uncovered 20 minutes to an hour after the animal disappears, it has curled itself around, facing the direction of entrance to the burrow. During excavation the animal covers up the entrance with loose soil. Indeed, only a tell-tale tail trail, where the tail has slid along the loose soil, is left as evidence.

Two or three days later the salamander will open an entrance to the burrow and will be poised with its head at surface level. It will retreat an inch or so if an initial rapid movement toward the hole is made by an investigator. It can be lured partially out of the hole by an insect or small toad, but it will not come out beyond its hind legs. The animal sits with its head at the surface night and day despite direct sunlight and temperatures up to 93 degrees F. On several occasions an animal left its burrow during and after heavy night-time rain. The next day the burrow entrance was gone, but the trail of the tail could be seen. Two or three days later, within a few inches of the original burrow entrance, the animal had opened another entrance and was facing out once more. On several occasions over a month's period, one animal was found curiously arranged, facing into its burrow with only its tail exposed. A live cricket touching its tail induced it to turn around and catch it.

One side of the hill was faced with plexiglas along which several burrows were made by the investigators. Salamanders, finding these burrows, would proceed into them and, in an hour or so, turn around to face the entrance. They would disappear from these burrows in 1 to 2 days and would not return to them again.

These observations show that tiger salamanders can burrow. The sequence of limb movements and the position of the head sharply identify burrowing as distinguished from walking. In burrowing there are independent non-alternate diggings by forelegs, while the hindlegs are moved alternately in a plowing movement often unsynchronized with the forelegs. The head is bent, pressing down into the soil. In walking the head is erect, and the legs are moved in typical sinusoidal quadrupedal gait (Gray and Lissman 1940).

Whether tiger salamanders under natural conditions dig their own burrows is still open to question. They will enter a prepared hole, but we believe that, at least on occasion, it must be more efficacious to dig their own.

Tiger salamanders and their relatives have been assumed to be burrowing animals. Pike (1886) dug out marbled salamanders three feet down below soft ground. Hamilton (1946) located a subspecies of tiger salamander in burrows containing rodents, which he thought had made the burrow. A spotted salamander was found at the mouth of a tunnel that she may or may not have excavated (Gordon 1968). The commonly found plethodontid salamanders have been more extensively observed than tiger salamanders, possibly because they live close to the surface. They are far less muscular than tiger salamanders, and although they have been observed sitting at the mouth of burrows (Huheey 1964, Valentine 1964), they do not seem to actively dig them. They can, however, wedge out burrows using cracks and crevices in the substrate (Gordon 1952, Heatwole 1960, Brandon 1965). Siren and Amphiuma have also been observed in burrows under adverse, dry conditions (Knepton, Jr. 1954, Freeman 1958).

ACKNOWLEDGMENT

We would like to thank George Petievich of the M.I.T. Physical Plant for providing outside space to set up our enclosure, Michael Sporer for aid in constructing the enclosure, John Barrett and Harold Edgerton for the use of a movie camera and projector, and Dr. C. Robert Shoop for many suggestions concerning the text.

This work was supported in part by a grant from Bell Telephone Laboratories, Inc., in part by the National Institutes of Health (Grant 5 PO1 GM14940-05), and in part by NGMS (Grant 5 PO1 GM1555-05).

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FIGURE CAPTIONS

FIGS. 1-7. A tiger salamander burrowing. The elapsed time from initial digging to disappearance was 14 minutes.

FIG. 8. Trail left by the tail during the burrowing shown in Figs. 1-7.

FIGS. 9-10. Uncovering the salamander 30 minutes later shows animal facing entrance (arrow).

FIG. 11. View of the enclosure from above. North is towards left.

FIG. 12. Salamander in burrow (Square in Fig. 11.)

FIG. 13. Salamander in artificial burrow along plexiglass.

FIG. 14, 15, 16. Typical sequence of movements in burrowing, traced from 16-mm movie footage. Tracings were made at the end of each movement. The direction of subsequent movement is indicated by arrow. Numbers refer to the movie frame of the particular tracing with the beginning of each series arbitrarily given as 0. Fig. 14. Left foreleg digging. Fig. 15. Twenty sec. later, alternating hind limb plowing. Fig. 16. Five sec. after Fig. 15, right foreleg has started digging while hind limbs have reversed position.

FIG. 17. Frame from movie film showing salamander throwing earth backward (arrow) at end of sequence shown in Fig. 16.



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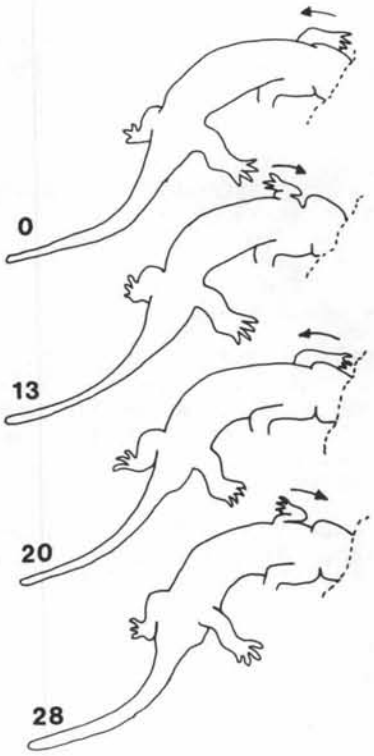
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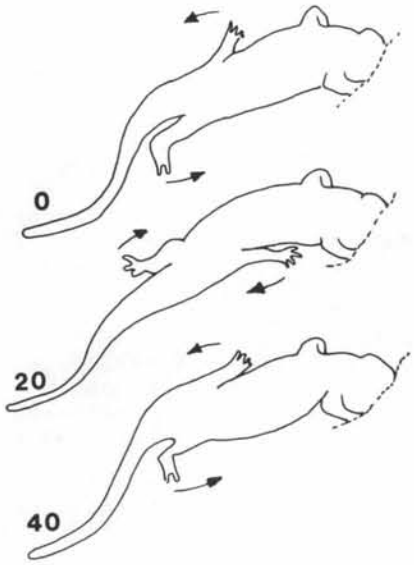
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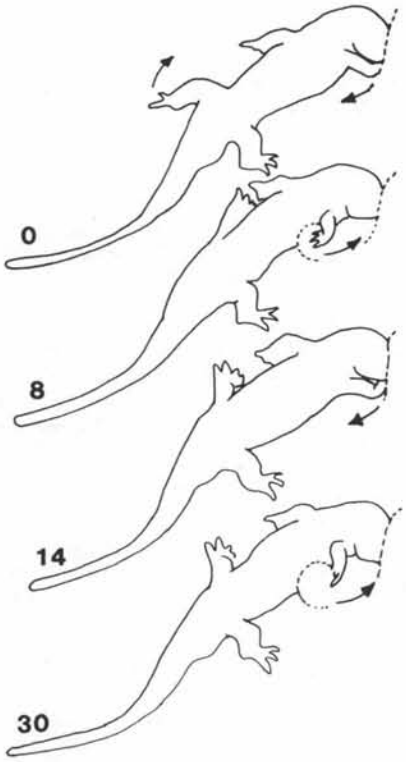
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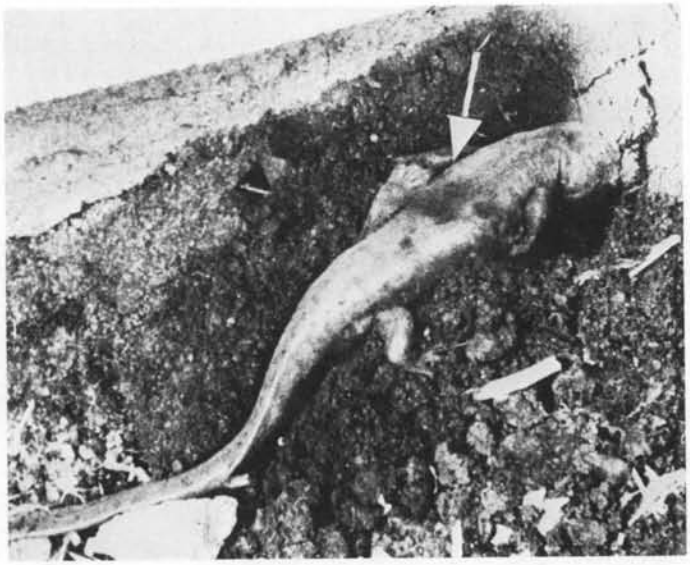
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COMMENTS ON THE TYPE OF *ENGYSTOMA MEXICANUM* PETERS, A JUNIOR SYNONYM OF *GASTROPHRYNE USTA* (COPE)

Craig E. Nelson

Peters (1870) described *Engystoma mexicanum* from "the warmer parts of Mexico (Matamoros and other sites)" in a paper "on Mexican amphibians" sent by "Mr. Berkenbush in Publea." No other information on geographic origin was given and no type was cited. The description was quite short "In form and color very similar to *E. carolinensis*, but with two salient tubercles on the heels, of which the inner is the largest, with salient tubercles under the fingers and toes and with markedly shorter fingers and toes. Total length 0.026 m., head length 0.008 m., head breadth 0.009 m., front limb 0.013 m., hand 0.015 m., third finger 0.003 m., hind limb 0.031 m., foot 0.016 m., fourth finger 0.006 m." (my translation of entire description except for a footnote dealing only with other genera).

Cope (1871) and subsequent workers have consistently considered *E. mexicanum* a junior synonym of *E. ustum* Cope (1866) which is now placed in *Gastrophryne* (Carvalho, 1954; Nelson, 1972b). Two metatarsal tubercles as cited by Peters are found in *G. usta* and in no other *Gastrophryne* but with the original description one cannot separate *E. mexicanum* from *Hypopachus*, the only other Mexican microhylid genus.

The records of the Zoological Museum of Humbolt University of Berlin indicate that their number 6667 (Figs. 1-3) from "Mexico" is the type of *E. mexicanum* Peters. Through the courtesy of Dr. Gunther Peters, I have examined this specimen. Its features match those in the type description. It has two transverse pharyngeal folds and a firmisternal girdle and is therefore a microhylid. It differs from *Hypopachus* in lacking digital webbing. The specimen is the leathery brown color characteristic of frogs which have been preserved for decades and no markings are evident. However, the presence of two metatarsal tubercles and the absence of hindfoot webbing are sufficient to distinguish the specimen from all North American microhylids except *G. usta*.

Taylor and Smith (1950) restricted the type locality of *E. mexicanum* to (Izucar de) Matamoros, Puebla. There are no other records of *G. usta* from Puebla, nor any valid records from other inland areas (Nelson, 1972a). The restricted type locality therefore seems inappropriate.

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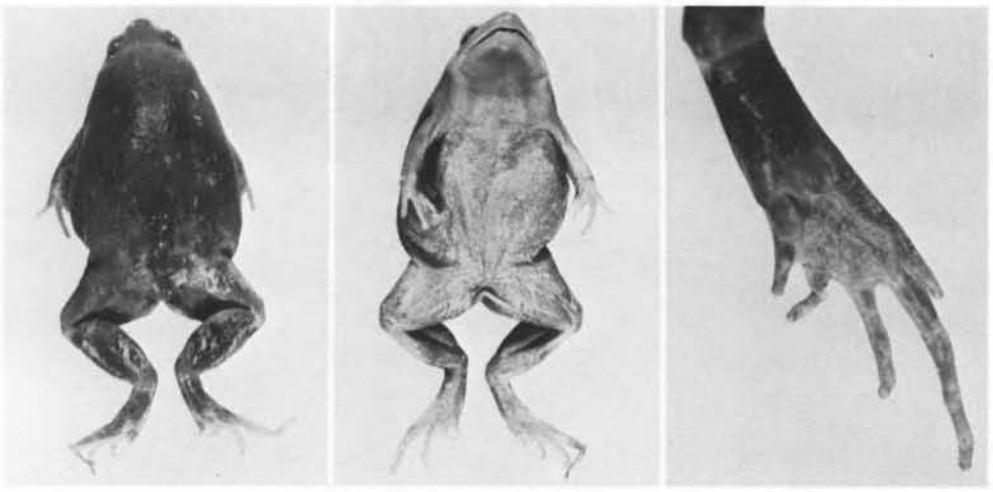
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NOTEWORTHY ARIZONA HERPETOFAUNAL RECORDS

Donald E. Hahn and Clayton J. May

The herpetofauna of southern Arizona has received a great deal of attention in the past decade, and the ranges of most species in this area are fairly well known. Portions of the northern part of the state have also been extensively studied, especially the Grand Canyon area. The distribution of most species of reptiles and amphibians in the vast area of central Arizona is by contrast poorly known.

Over the past few years a number of specimens, some of which represent significant distributional records, have been taken or examined by us, primarily in central Arizona, and are here listed. We wish to thank the following people for allowing us to report on specimens in their care: J. Fouquette, Arizona State University (ASU); S. W. Carotheres, Museum of Northern Arizona (MNA); R. S. Funk, Southern Illinois University, Edwardsville (RSF); and S. F. Hale, Tucson, (SFH). We would also express our appreciation to Dr. Larry D. Wilson for reading the manuscript and offering many valuable suggestions. DEH and CJM numbers represent specimens in our personal collections.

Unless otherwise noted, all range extensions are based on the distribution maps given by Stebbins (1966).

Ambystoma tigrinum - Yavapai Co., 2 mi. NNE Hillside, DEH 3983. This specimen extends the known range of this species slightly to the southwest in Arizona and into the Lower Sonoran Life Zone.

Bufo alvarius - Yavapai Co., 5.0 mi. NW Hillside, DEH 5002; 1.1 mi. NW Hillside, DEH 5001. These records are approximately 20 miles WNW of the nearest published localities: 31 and 16 mi. NW jct. Arizona Hwy. 71 and U. S. Hwy. 93 (Fouquette, 1970).

Bufo cognatus - Coconino Co., 4 mi. E Wupatki Nat'l. Mon. boundary (U. S. Hwy. 89) on Forest Rt. 545, CJM 175. This specimen significantly extends the known range of this toad southward in northern Arizona.

Gastrophryne olivacea - Santa Cruz Co., Pajarito Mts., 9 mi. W jct. Arizona Hwys. 93 and 289 (Ruby Rd.) CJM 1190. This specimen is an adult female albino and represents the first record of albinism in this species. In life the specimen had a dorsal pattern like that of normal frogs of the area except that the yellow-brown blotches formed broken lateral lines converging just behind the head. The iris was pink.

Captive frogs from the same chorus deposited an abundance of eggs, yet the albino failed to reproduce after three days in amplexus. Gross examination of the ovaries revealed most ova were darkly pigmented and small in comparison with those from normal-colored females in the same population.

Trionyx spinifera - Yavapai Co., Cottonwood, DEH 5900; jct. Oak Creek and Verde River, DEH 5240. These specimens extend the known range of this introduced species approximately 100 miles northward into central Arizona.

Sceloporus clarki - Gila Co., 1.5 mi. S Pine, DEH 4584; Coconino Co., Sedona, DEH 5723; Yavapai Co., 13.5 mi. N Cottonwood; numerous other localities throughout the Verde Valley in Yavapai Co. These records extend the known range considerably to the north and northeast.

Cnemidophorus inornatus - Coconino Co., 2.1 mi. S Interstate Hwy. 40 on Meteor Crater Rd., MNA 27-314 through 320, DEH 5907. Lowe, et al (1966) mentioned this relictual population in the Colorado River Basin but did not give any specific locality data. Field work by the junior author has shown this population to be restricted to the grasslands and the peripheral disclimax grasslands along the north and east edges of the San Franciscan volcanic field. Variation and taxonomic status of this population will be presented elsewhere.

Heloderma suspectum - Yavapai Co., Page Springs; 11 mi. N Cordes Junction. These specimens were examined and released, and confirm the provinence of the old Verde Valley record from Fort Verde (Bogert and Del Campo, 1956). Dr. H. S. Colton of the Museum of Northern Arizona has also examined a gila monster from Clear Creek, Yavapai Co.

Leptotyphlops humilis - Yavapai Co., Cottonwood, DEH 5375, 5748, 5834; 6.5 mi. SSE Cottonwood, DEH 5009; 3 mi. W Sedona, DEH 5173. These records extend the known range of this snake 40 miles northward and northwestward in central Arizona. The nearest published locality is 1 mi. W Childs, Yavapai Co. (Hulse, 1971).

Lichanura trivirgata - Mohave Co., 10.2 mi. NW Santa Maria River on U. S. Hwy. 93, ASU 13629; Yavapai Co., 2.1 mi. SE Yavapai-Mohave Co. line on U. S. Hwy. 93, CJM 950. These specimens extend the known range of this species northward 40 miles from the nearest published record of Aguila, Maricopa Co. (Lowe, 1964).

Chilomeniscus cinctus - Maricopa Co., Fort McDowell, DEH 3876. This is a northern peripheral record for this uncommon species.

Elaphe triaspis - Pima Co., Empire Mts., Lead Mt., Chief Mine, DEH 3694. This specimen represents the first record for this species in the Empire Mts., which extends the known range of this species slightly northeastward in Arizona. Previously this snake was known from only four mountain ranges within Arizona: the

Baboquivari, Pararito, Santa Rita, and Chiricahuas.

Lampropeltis getulus - Coconino Co., 1.1 mi. W Coconino-Navajo Co. line on U. S. Hwy. 66, RSF 3393; 3.7 mi. W Sunrise Trading Post on Indian Hwy. 15, MNA 27-431. These records significantly extend the known range of this species eastward in northern Arizona.

Phyllorhynchus decurtatus - Yavapai Co., 14 mi WNW Hillside, DEH 3975; Mohave Co., 16.2 mi. SE Wikieup, DEH 3974. These localities extend the known range of this species 30 miles NNW and 50 miles NW respectively from the nearest published locality, 2.5 mi. N Congress Junction, Yavapai Co. (Fowlie, 1965).

Masticophis bilineatus - Yavapai Co., 8.9 mi. ESE Camp Verde, DEH 5920. This specimen represents a significant range extension northward.

Masticophis flagellum - Yavapai Co., Clarkdale, DEH 3956, 5096, 6480; Cottonwood, DEH 5527, 5546; 9 mi. NE Cottonwood, DEH 5215. This is a fairly common snake in the Verde Valley. Wilson (1970) did not examine any specimens from this far north in central Arizona.

Salvadora hexalepis - Conconino Co., Wupatki Nat'l. Mon., 20 mi. E U. S. Hwy. 89 on Forest Route 545, SFH 2064. This specimen represents a southward range extension in northern Arizona and the first locality south of the Little Colorado River. These new distribution records of Bufo cognatus, Lampropeltis getulus, and this species seem to coincide with the Great Basin Desert and adjacent grasslands of the Colorado River drainage basin in northern Arizona.

Tantilla planiceps - Yavapai Co., Cottonwood, DEH 5690; Bell Rock, 5.3 mi. S Sedona, DEH 5729; 8 mi. NW Santa Maria River on U. S. Hwy. 93, ASU 13203. The first two records extend the known range of this species approximately 100 miles northward from the nearest published locality of Phoenix (Tanner, 1966). The last specimen helps bridge the gap in the ranges of T. p. atriceps and T. p. utahensis, and is 27 mi. NW of Date Creek, Yavapai Co., the nearest locality from which this species was previously known (Tanner, 1966).

Trimorphodon biscutatus - Coconino Co., Sedona, DEH 5722. This specimen extends the known range of this species approximately 50 miles NNE of the nearest published record, 5.4 mi. S jct. 79 and 69 on 69 (Black Canyon), Fowlie, 1965.

Micruroides euryxanthus - Yavapai Co., Bridgeport, DEH 5376; jct. Oak Creek and Verde River, MNA 27-491. Both specimens were taken while crawling about on the surface during the day. These records extend the known range of this species approximately 45 mi. ENE from the nearest published locality, Fort Whipple, Yavapai Co. (Fowlie, 1965).

Crotalus scutulatus - Yavapai Co., Cottonwood, DEH 5390; 5 mi. SSE Cottonwood, DEH 5828; Clarkdale, DEH 3570. These specimens extend the known range approximately 35 miles ENE of the nearest records, Drake and Prescott, Yavapai Co. (Klauber, 1930).

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GEOGRAPHIC DISTRIBUTION

HERPETOLOGICAL REVIEW will publish brief notices of new geographic records, in order to make these available to workers in published form. The STANDARD FORMAT for these records is:

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Please submit new locality records to: GEORGE R. ZUG, Division of Reptiles & Amphibians, National Museum of Natural History, Washington, DC 20560.

N E W R E C O R D S

AMBYSTOMA TEXANUM. U.S.A., Alabama, Baldwin Co., Mobile Delta, approx. 5 air mi. W. of Stockton on Mound Is.; 9 May 1970; A. Floyd Scott & R. M. Johnson. Verified by Robert H. Mount & George W. Folkerts. Univ. S. Alabama Herpetological Collection 1756-1772. First records for lower Coastal Plain of Alabama. Submitted by A. Floyd Scott & R. M. Johnson, Dept. of Biol. Sci., Univ. S. Alabama, Mobile, Alabama 36608.

EUMECES ANTHRACINUS ANTHRACINUS. Ohio, Vinton Co., Brown Township, Section 17, near junction of Long Ridge and Furnace Roads; 12 July 1970; W. D. Parker. W. D. Parker & G. R. Zug. The first record for Ohio. National Museum Natural History, USNM 193801. Submitted by W. D. PARKER, Big Cypress Center, P.O. Box 1408, Naples, FL 33940.

GRAPTEMYS GEOGRAPHICA. Louisiana, Ouachita Parish, ca. 8 mi. N of Monroe, Ouachita River near Walls Lake; 14 March 1963; N. H. Douglas. N. H. Douglas. Northeast Louisiana University, NLU 622. First record for Louisiana. Submitted by N. H. DOUGLAS, Department of Biology, Northeast Louisiana University, Monroe, LA 71201.

HEMIDACTYLUS PALAICHTHUS. Tobago, St. John Parish, Little Tobago (= "Bird-of-Paradise") Island; 23 July 1971; R. G. Tuck, Jr. R. G. Tuck, Jr. National Museum of Natural History, USNM 192763-65. First record for Tobago; Florida State Museum, UF/FSM 26252-55 are this species but were reported to be H. mabouia by Dinsmore (Quart. J. Florida Acad. Sci. 32(4)1969:408. Submitted by R. G. TUCK, Jr., Division of Reptiles & Amphibians, National Museum of Natural History, Washington, DC 20560.

PHYSIOLOGICAL MISCELLANEA

Instructions for Contributors

The aim of this Department is to provide a vehicle for publication of isolated physiological measurements of amphibians and reptiles. It can place in the literature data which, while they are fully rigorous and valid, are too scanty to warrant the usual sort of publication. What we have in mind are such things as field data gathered during trips to foreign countries or measurements made on a rare animal in the laboratory -- in general, any situation in which useful data have been gathered and there is no likely prospect of further measurements being possible. The Department is not intended for publication of data too shaky to be accepted elsewhere, or for quick publication of preliminary results in an attempt to establish priority.

For the data reported here to be useful, it is essential that the techniques used to gather them be rigorous. This is particularly true because we propose to publish data involving fewer replications than usual. On the other hand, publication is expensive and brevity is necessary. Authors should prepare their manuscripts in a 44-space line in the following format:

TITLE (Include species of animal and type of measurement - e.g. "Body temperatures of Bothrops atrox in the Field," not "Physiological Observations of Snakes.")

METHODS (Make this section as brief as is possible without sacrificing clarity. Refer to previously published descriptions of techniques when possible.)

RESULTS (These may be entirely in tabular form if it saves space.)

DISCUSSION (Only if absolutely necessary; in most cases it won't be.)

LITERATURE CITED (Since most papers will have neither an introduction nor discussion, few will cite any literature.)

AUTHOR (Full name and address.)

Because it is essential to maintain a high level of rigor, all manuscripts will be sent to referees who will be asked to evaluate (1) the value of the data presented, and (2) whether the contribution adheres to the standards outlined above. Manuscripts may be edited to improve clarity or brevity; edited manuscripts will be returned for author's approval.

CURRENT HERPETOLOGICAL TITLES, XX: 1971 - 1972

Herpetological Information Search Systems
American Museum of Natural History
New York, New York 10024

We have brought to your attention more than 16,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and more than 1000 through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, etc. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. A complete list of the journals covered by us is published in Herpetol. Yearb. 1971. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1971-1972) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be more current than the previous quarterly issues allowed.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 16 Jan. 1972 through 1 April 1972. HR is computer printed and because of necessary production procedures there is a possibility that on occasion the titles from a single issue of a journal may appear in several issues of HR. Periodical title abbreviations follow the International List of Periodical Title Word Abbreviations (based on the Amer. Nat. Standards Comm. Z39.) (Chemical Abstracts Service, Columbus, Ohio, US.).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and M. Coxe. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

This is contribution Number 38 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

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HISS proposes to continue publication of "Current Herpetological Titles" after the present supporting NSF grant expires in December. However, neither the SSAR nor the Herpetologists' League (and perhaps no unified society) can fully support this portion of the HISS program, which is basic to its other operations. It probably will be necessary, therefore, for HISS to charge individual subscriptions of $10 or $15 in order to continue this service (see the description of coverage in the introductory section on this page).

WE have never assumed that herpetologists or their societies would pay more than a portion of HISS's $100,000 annual budget, but they must give substantial indication of their interest for it to seem worthwhile for us to seek the outside funds necessary for continuing.

WE anticipate that HISS services and publications might produce one-quarter of the budget in 1972, and perhaps one-half of it in 1973. In order to achieve these financial goals, however, we must have more subscriptions to our publications and services, as well as donations of funds from institutions and individuals.

Therefore, we encourage all who feel that the HISS operation should continue to support it both by letter (to HGD) and by subscription to at least one of its several publications and services (see page 120).

H. G. Dowling
HISS Director



- 1971 -

- A -

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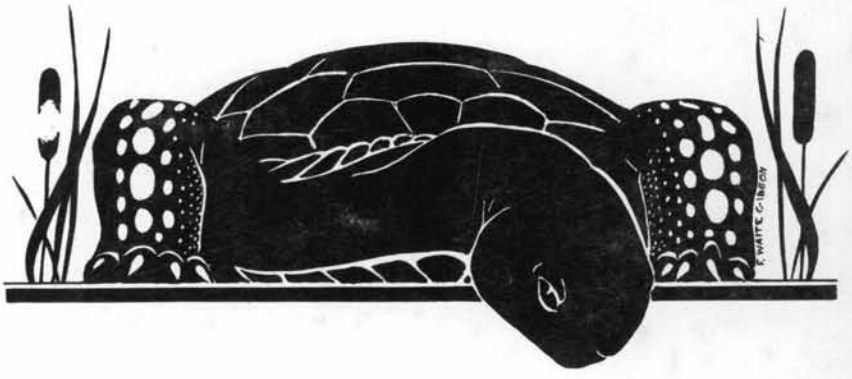
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HERPETOLOGISTS

LEAGUE

The Herpetologists' League is an international organization which was established in 1936 by Major Chapman Grant. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1971 it had 900 members and fellows (including Life and Honorary members), and more than 400 institutional subscriptions to its journal, HERPETOLOGICA, which has been published continuously since 1936.

All persons interested in herpetology are eligible for membership. (See Third Cover for membership information.)

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Herpetological Review

VOLUME 4, NUMBER 2
APRIL 1972

26 THE LAKE TEXOMA MEETING. Discussions on possible amalgamation will keynote the joint meeting at the University of Oklahoma Biological Station.

-- SEE THE CENTER SECTION --

28 CALENDAR

EDITORIAL: "Current Titles" needs support of herpetological community.

POSITION WANTED

29 CURRENT HERPETOLOGICAL TITLES: XIX. More than 1600 titles were held up by the East Coast dock strike.

72 LATE NEWS

● PUBLICATION OFFICE Herpetological Information Search Systems, The American Museum of Natural History, Central Park West at 79th Street, New York, N.Y. 10024.

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THE LAKE TEXOMA MEETING: August 15-17, 1972

The University of Oklahoma Biological Station will be the site for the fifteenth annual meeting of the Society for the Study of Amphibians and Reptiles, held jointly with the Herpetologists League.

University of Oklahoma Biological Station, Lake Texoma, in south-central Oklahoma is a permanent field station designed and operated to offer opportunities for study and research in ecology and natural history and those phases of taxonomy, evolution, morphology, and physiology that require extensive study of organisms in their natural habitats. The Biological Station is an instructional and research unit of the University of Oklahoma and subject to the general rules and regulations thereof. It is situated on the north shore of the Red River arm of Lake Texoma at the mouth of Buncombe Creek, two miles east of Willis, and 18 miles south of Madill, Marshall County, Oklahoma.

Lake Texoma is an impoundment of the Red and Washita rivers, formed by the Denison Dam, built by the U.S. Army Engineer Corps at Denison, Texas. The gates of the dam were first closed in July, 1942, and the reservoir was filled to power-pool level (617 feet above sea level) by 1945. The lake at power-pool level has a surface area of 93,000 acres, a capacity of 5,715,700 acre feet, and a shoreline of approximately 700 miles. Its drainage basin occupies 38,291 square miles. The Red River





separates the states of Oklahoma and Texas; therefore, the lake is bounded by both states.

The biotic province in which Lake Texoma and the surrounding region are located is characterized by tall grass prairies and blackjack-post oak forests. Bottom land and flood plain vegetation are found along many of the tributary streams. Low limestone hills covered with sand, clay, loam, or a mixture of these, often with extensive stone outcrops, are abundant as are plains and valleys with similar soil types. Cultivated fields of various crops, eroded areas in beginning to advanced states, permanent and intermittent streams, farm ponds, and marginal wet lands all abound in the vicinity.

The location of the Biological Station -- on a man-made lake in an area with a variety of both aquatic and terrestrial environments where there has been little biological investigation -- greatly enhances the opportunities for research in both botany and zoology. The biology of such reservoirs as Lake Texoma is but slightly known; the number of these reservoirs is increasing. The need for a knowledge of their biology is consequently all the greater. Since Lake Texoma, primarily for flood control, is also used for electric power production, the



areas of its shorelines are alternately inundated during periods of high water, and exposed by draw-down. The constantly changing environment created by these water fluctuations offers many interesting and dynamic ecological problems. The large and diverse fish population and the many aquatic or water-haunting birds and mammals present vital problems for taxonomists and ecologists. Several large, well-isolated islands (on the largest of which are five small lakes or ponds), each occupied by extensive flora and fauna, including fish, amphibians, reptiles, birds, and mammals, are ideal for population studies.

It is impossible at the present time to list the number of species of plants and animals that occur in the region. Too little is known. Intensive collecting and research in the area began in the summer of 1949; the many species of plants and animals that have been collected - both invertebrate and vertebrate - have added new records for the county and even for the state, and extended the knowledge of the ranges of many species.

The herp fauna of this area is somewhat ecotonal having representatives of both the eastern forested areas and the south-western grasslands. However, August is a warm month in this area and herp activity will be slowed down. A list of the local herps will be available at the registration table. A living display of many of the herps of the area is planned for the meeting, as well as a photo-art exhibit.

The low relief Arbuckle Mountains about 30 miles to the north of Lake Texoma extend east as intermittent granite and limestone outcrops. Within this uplift is the Platt National Park (our country's smallest) famous for its mineral waters. Lake Murray and Lake Texoma State Parks, each with cabins and a lodge, are within 30 miles of the Station.

Contributed paper sessions will be held on Tuesday and Wednesday, August 15 and 16, while local field trips are planned for Thursday the 17th (Box lunches will be provided). Collecting is not permitted in the immediate station area. The theme of this meeting is "The Future of Herpetology" and appropriate paper presentations are encouraged.

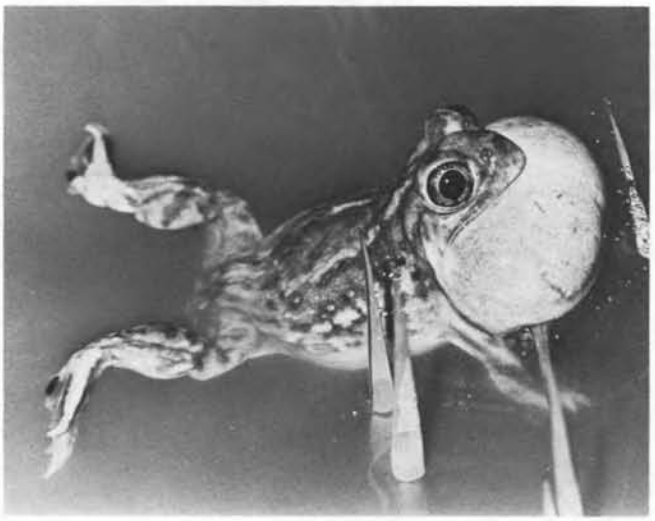
An informal social gathering will be held on Tuesday evening and a banquet on Wednesday evening. Discussions of a possible amalgamation of the two societies will be an important part of the sessions.

Persons arriving by bus or train at nearby towns will be picked up, if proper notification is made on the registration form or by letter at least two weeks prior to the meetings. Those with private cars are encouraged to drive. Limited bus service will be provided from and to the Oklahoma City Airport (see below).

Lodging and meals will be available at the Biological Station, although only limited housing facilities are available for families. Limited camping facilities will be available at the Station grounds (with meals at the Station) and at nearby public camp grounds on the lake. Recreation facilities include volleyball and horseshoe courts, table tennis, swimming, row boating, and fishing.

Room and board at the Biological Station will be $8.00 per day, $5.00 per day for meals only. There will be a preregistration fee of $7.50 to cover the cost of the program, beer social, banquet and other materials. Registration after 15 July will cost $10.00. The call for papers, registration forms, and detailed information will be found in the center pages of this issue of HR.

The local committee for the meeting is composed of Dr. Charles C. Carpenter, Dr. Hobart Landreth, and Dr. Victor H. Hutchison (chairman).



Scaphiopus bombifrons, Norman, Oklahoma, April, 1969. J. R. Purdue.

EDITORIAL

SINCE 1968 the Society for the Study of Amphibians and Reptiles has been providing a service to its members that it cannot pay for with its present dues structure. The Herpetologists' League, similarly unable, provided its members with this same service since early 1971. This service is CURRENT HERPETOLOGICAL TITLES, a literature alerting list prepared by HISS and supported by the National Science Foundation. The "Titles" section has made up a major part of HERPETOLOGICAL REVIEW since its second number (April, 1968).

NSF reduced its support to HISS and similar projects in 1971, and it seems likely that "Current Titles," along with other bibliographic projects, will receive no NSF support in 1973. This means that if HISS is to continue to operate, it will have to seek additional support from herpetologists (as well as from other sources), whether or not SSAR and HL amalgamate.

The Society of Vertebrate Paleontology has apparently already lost its NSF support, and at this moment is polling its members to determine if they are willing to sustain the "Bibliography of Fossil Vertebrates" with $15 or $25 memberships.

Rather than waiting until the cut has been made, it seems appropriate to inquire now if herpetologists are willing to make additional payments so that they could continue to receive "Current Titles." ARE herpetologists willing to pay $5 more? $10 more? More than $10?

If HISS is not strongly supported by the "herpetological community," there would appear to be little incentive to try to extend this operation beyond the current year. -- HGD.

POSITION WANTED

George R. Pisani (Museum of Natural History, University of Kansas, Lawrence, Kansas 66044) is currently seeking a herpetological or public education position. Qualifications include an M.S. degree (St. Bonaventure Univ.); 2.5 additional years of graduate course work at KU; 2.5 years of high school teaching; experience as a college teaching assistant (geology and biology); a broad background in nature photography and maintenance of captive herps; broad experience with the organization and presentation of educational programs for adults and youngsters (including mentally and physically handicapped); experience with the maintenance of a major museum herpetological collection. Personal resume is available upon request.

MEETINGS AND SOCIETIES

CALENDAR 1972

18-23 June.....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Boston.

July.....SALAMANDER SYMPOSIUM, Highlands Biological Station, North Carolina.

14-17 August...Combined Meeting: HERPETOLOGISTS' LEAGUE and SOCIETY FOR THE STUDY OF AMPHIBIANS and REPTILES, University of Oklahoma Biological Station, Lake Texoma.

September....INTERNATIONAL SOCIETY ON TOXINOLOGY, General Meeting, Institute of Organic Chemistry, Darmstadt, West Germany.

24-30 September...INTERNATIONAL CONGRESS OF ZOOLOGY, Monaco.

26-28 December....HERPETOLOGISTS' LEAGUE, Annual Meeting (Cosponsored by the SSAR), Washington, D.C. (with AAAS).

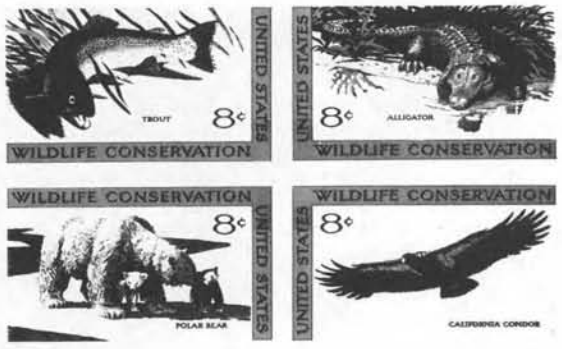
CALENDAR 1973

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, San Jose, Costa Rica.

4-11 August....FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

CALENDAR 1974

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Ottawa, Canada.



CURRENT HERPETOLOGICAL TITLES, XIX: 1970 - 1971

Herpetological Information Search Systems
American Museum of Natural History
New York, New York 10024

We have brought to your attention more than 14,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and more than 1000 through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, etc. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. A complete list of the journals covered by us is published in Herpetol. Yearb. 1971. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1971-1972) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be more current than the previous quarterly issues allowed.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 1 Sept. 1971 through 15 Jan. 1972. HR is computer printed and because of necessary production procedures there is a possibility that on occasion the titles from a single issue of a journal may appear in several issues of HR. Periodical title abbreviations follow the International List of Periodical Title Word Abbreviations (based on the Amer. Nat. Standards Comm. Z39.) (Chemical Abstracts Service, Columbus, Ohio, US.).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and M. Coxe. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

This is contribution Number 37 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

*H*ERPETOLOGICAL
*I*NFORMATION
*S*EARCH
*S*YSTEMS

NEW H I S S SERVICE



HISS is pleased to announce the first issues of its planned series of special bibliographies.

THESE first numbers are no more than offset or xerox lists of titles. We expect to have several cross-indexed publications by the end of 1972.

THE FOLLOWING bibliographies are available now:

CHELONIA MYDAS.
PUBL HERPETOL (1): ca. 300 ref....$3.00

HERPETOLOGICAL TITLES in 1969.
PUBL HERPETOL (2): ca. 4000 ref...$8.00

LONGEVITY OF AMPHIBIANS AND REPTILES. *
PUBL HERPETOL (3): ca. 200 ref....$3.00

CHROMOSOMES OF AMPHIBIANS AND REPTILES. *
PUBL HERPETOL (4): ca. 1000 ref...$5.00

REPRODUCTIVE SYSTEM OF REPTILES.
PUBL HERPETOL (5): ca. 500 ref....$5.00

ALBINISM IN AMPHIBIANS AND REPTILES.
PUBL HERPETOL (6): ca. 200 ref....$3.00

* Updated from the list that will appear in the 1971 Yearbook of Herpetology.

[The prices quoted above are for INDIVIDUALS. INSTITUTIONAL prices are double the quoted amounts.]

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-- 1970 --

- A -

ABROL,PREM
1970. Nucleolar extrusions in the male germ cells of Rana tigrina.
RES BULL PANJAB UNIV SCI 20(parts 3-4):427-428, 1 fig.

ALHO,CLEBER J.R.
1970. Frequency of infestation by Strongyluris freitasi Alho, 1969 in Tropidurus torquatus (Wied).
REV BRASIL BIOL 30(4):539-542, 1 fig., 2 tab.

ALLEN,ALBERT CURTIS,JR.
1970. Ossification of the skull and deposition of aragonitic crystals in the endolymphatic sacs of the urodele Ambystoma maculatum. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-15,075).
DISS ABSTR INT B 31(12):7680-7681.

ALONSO-BEDATE,M. and M.T.SERRANO
1970. Factors mediating in ovulation and experimental fecundation of Rana ridibunda.
BOL REAL SOC ESPAN HIST NATUR SECC BIOL 68(1-2):25-31, 1 fig., 2 tab. (Span, Engl summ).

ANDREOZZI,GIULIANA, VIRGILIO BOTTE and GIOVANNI CHIEFFI
1970. Ricerche istochimiche sull'ovidutto di Triturus cristatus carnifex, Durante la riproduzione.
BOLL ZOOL 37(1):69-77, 4 fig. (some col.), 1 tab.

ANGELETTI,RUTH ANNE HOGUE
1970. Studies on the nerve growth factor from snake venoms: biochemical and biological properties. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 69-22,516)
DISS ABSTR INT B 30(7):3010-3011.

ANON
1970. Amphibians bred in captivity.
INT ZOO YEARB 10:308-309.

ANON
1970. Crocodile crash in Uganda.
KINGFISHER 5(6):11.

ANON
1970. Crocodiles in New Guinea.
KINGFISHER 5(6):13.

ANON
1970. Crocodiles protected.
KINGFISHER 5(6):12.

ANON
1970. Census of rare animals: reptiles and amphibians.
INT ZOO YEARB 10:334-343.

ANON
1970. 1970-Expedition year.
MUS ACT (CHICAGO ACAD SCI) (20):1-4, 11 fig.

ANON
1970. Manatees and crocodiles.
KINGFISHER 5(6):10.

ANON
1970. (Obit of) Charles E. Shaw; dies at 52.
HERP 7(1-2):0000.

ANON
1970. Reptiles bred in captivity.
INT ZOO YEARB 10:304-308.

ANON
1970. (Review of) Reptiles do the strangest things, by Leonora Hornblow and Arthur Hornblow, 1970.
HERP 7(1-2):52.

ANON
1970. Turtles in South Africa.
KINGFISHER 5(6):11.

ASHER,JAMES HARVEY,JR.
1970. Parthenogenesis and genetic variability. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-15,083)
DISS ABSTR INT B 31(12):7681.

ASHLEY,HOLVOR WALTER
1970. Studies on the distribution and metabolism of thyroid hormones in the bullfrog tadpole. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-6957).
DISS ABSTR INT B 31(9):5173.

ASPLUND,KENNETH K.
1970. Body size and distribution of whiptail lizards.
HERPETOL REV 2(4):6 (abstr).

AVERY,DAVID FRANKLIN
1970. Evolution of the iguanine lizards (Sauria, Iguanidae) as determined by osteological and myological characters. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-5992).
DISS ABSTR INT B 31(9):5706.

AYALA,STEPHEN CHARLES
1970. Protozoan parasites associated with California sandflies. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-20,768).
DISS ABSTR INT B 32(2):1282.

- B -

BANARESCU,P.
1970. Principii si probleme de zoogeografie. Ed. Acad. Rep. Socialiste Romania. 260 pp., 40 fig.

BANI,GASTONE
1970. The fine structure of a special cell type in the epidermis of several amphibia.
ARCH ITAL ANAT EMBRIOL 75(3-4):221-230, 14 fig. (Ital, Engl summ).

BARBERIS,CLAUDE and JACQUES GAYET
1970. Evaluation du rendement de la phosphorylation oxydative dans une fraction mitochondriale isolee du telencephale du Poulet au cours du developpement.
C R ACAD SCI (PARIS) D 271(8):718-721, 2 fig.

BARTHALMUS,GEORGE TIMOTHY
1970. Homing, home range, and the homing mechanism of the northern dusky salamander, Desmognathus fuscus fuscus. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-21, 719).
DISS ABSTR INT B 32(2):1282-1283.

BARTLETT,R.D.
1970. Incidences of parallelism in several reptiles and amphibians.
BULL CHICAGO HERPETOL SOC 5(2):18-21.

BARTLETT,R.D.
1970. Mexico 1970.
BULL CHICAGO HERPETOL SOC 5(2):24-30, 2 fig.

BARTLETT,R.D.
1970. Notes on keeping some of the arrow poison frogs in captivity.
BULL CHICAGO HERPETOL SOC 5(2):49-52.

BASILEWSKY,P.
1970. La faune terrestre de l'ile de Sainte-Helene. I. Vertebres.
MUS ROY AFR CENT ANN (ZOOL) 181:77-130.

BEALL,ROBERT JOSEPH
1970. An investigation on the effect of cold exposure on the cardiac metabolism of the turtle Chrysemys picta. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-6051).
DISS ABSTR INT B 31(9):5574.

BERGER,LESZEK
1970. Exposition of the green frogs in zoo.
PRZEGL ZOOL 14(2):249-256, 8 fig. (Pol, Engl summ).

BEZY,ROBERT LEE
1970. Karyotypic variation and evolution of the lizards in the family Xantusiidae. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-4242).
DISS ABSTR INT B 31(8):5069.

BICKERT,JAMES HERBERT
1970. Water relations in four species of the salamander genus Desmognathus. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-331).
DISS ABSTR INT B 31(7):4393.

BLACK,JEFFREY H.
1970. Turtles of Montana.
MONT WILDLIFE 2:26-32, 10 fig.

BLUMENKRANTS,NELLY and J.C.CALAMERA
1970. Les variations pendant l'annee de l'acide ascorbique et des substances metaboliques qui lui sont reliees, dans les testicules de Bufo arenarum Hensel.
C R SEANC SOC BIOL FILIALES (PARIS) 164(12):2659.

BOCKMAN,DALE E.
1970. The thymus, pp. 111-133, 10 fig., 1 tab., In, Carl Gans and Thomas S. Parsons (Eds.), Biology of the Reptilia. Volume 3. Morphology C. Academic Press, New York.

BOEHLER,ERNO and PAUL MUELLER
1970. Bemerkungen zur variabilitaet von Liolaemus occipitalis.
SALAMANDRA 6(3-4):130-131, 1 fig. (Engl summ).

BOESEL,RAINER
1970. Die Tanycytenglia des Zwischenhins cryptodirer Schildkroeten (Testudines, Reptilia). III. Beitraege zur Feinstruktur von Ependymgliazellen des dritten Ventrikels von Testudo hermanni Gmelin.
J HIRNFORSCH 12(3):195-206, 16 fig. (Engl summ).

BOESEL,RAINER
1970. Die Tanycytenglia des Zwischenhirns cryptodirer Schildkroeten (Testudines, Reptilia). I. Matrixdynamik und Entwicklung des Ependyms bei Emys orbicularis L. Vergleiche mit den Verhaeltnissen bei Eretmochelys imbricata L.
J HIRNFORSCH 11(6):519-535, 13 fig. (Engl summ).

BOESEL,RAINER
1970. Die Tanycytenglia des Zwischenhirns cryptodirer Schildkroeten (Testudines, Reptilia). II. Vergleichend-histologische Untersuchungen der Adultmorphologie der Tanycytenglia des dritten Ventrikels bei einigen Testudinoiden.
J HIRNFORSCH 12(1-2):29-43, 25 fig. (Engl summ).

BOICE,ROBERT
1970. Competitive feeding behaviours in captive Terrapene c. carolina.
ANIM BEHAV 18(part 4):703-710, 4 fig., 2 tab.

BOICE,ROBERT and CAROL BOICE
1970. Interspecific competition in captive Bufo marinus and Bufo americanus toads.
J BIOL PSYCHOL 12(1):32-36, 2 fig., 3 tab.

BONS,N.
1970. Le cycle sexuel du male chez Acanthodactylus erythrurus lineomaculatus Dum. et Bibr. (Sauria, Lacertidae).
BULL SOC SCI NATUR PHYS MAROC 49(1-2):161-203, 4 fig., 1 tab., 3 pl. (Engl summ).

BOURGAT,ROBERT M.
1970. Ecological and biological researcn on Chamaeleo pardalis Cuvier 1829 from the Reunion and Madagascar isles.
BULL SOC ZOOL FR 95(2):259-269. (Fr, Engl summ).

BOYDEN,THOMAS W.
1970. What's up doc?
BULL CHICAGO HERPETOL SOC 5(2):9-11.

BRATTSTROM,BAYARD H.
1970. Precision of behavioral thermoregulation in lizards.
HERPETOL REV 2(4):6 (abstr).

BREULL,W. and K.KARZEL
1970. Influence of phenylbutazone on the membrane resting potential of frog skeletal muscle fibres in vitro.
PHARMACOLOGY (BASEL) 4:25-32, 3 fig.

BROOKS,GARNETT R.
1970. Food ecology of a tropical frog, Leptodactylus fallax.
HERPETOL REV 2(4):6 (title only).

BROWN,CHARLES WILLIAM
1970. Hybridization among the subspecies of the plethodontid salamander Ensatina eschscholtzi. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-752).
DISS ABSTR INT B 31(7):4394.

BROWN,TIMOTHY WALLACE
1970. Autecology of the sidewinder (Crotalus cerastes) at Kelso Dunes, Mojave Desert, California. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-9215).
DISS ABSTR INT B 31(10):6336-6337.

BROYLES,ROBERT HERMAN
1970. Development and characteristics of glucose-6-phosphate and 6-phosphogluconate dehydrogenases in the sea urchin and the frog. (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 71-8986).
DISS ABSTR INT B 31(10):5786-5787.

BRYGOO,E.R and CH.A.DOMERGUE
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INFORMATION ON

THE LAKE TEXOMA MEETING

15 - 17 August 1972



REGISTRATION FORM

Lake Texoma Meeting, 15-17 August 1972

(Please Print)

NAME:_____ INSTITUTION:_____

ADDRESS:_____

MEMBER OF: _____SSAR _____HL

Expected date and time of arrival by auto_____; by bus at Marietta_____; by plane at Oklahoma City_____, Airline and Flight No._____.
Do you desire shuttle service?_____.

	No. Persons	Amount
Registration. $7.50 per person ($10 at meeting)	_____	_____
Room and meals. Special package, Monday night (14 Aug.) through Thursday breakfast (17 Aug.) $20 per person.	_____	_____
Room. $3 per night per person.	_____	_____
Meals. Monday night through lunch on Thursday. Breakfast, $1.50 (T, W, Th); lunch, $1.50 (T, W, Th); dinner, $2.00 (M, T, W).	_____	_____
Banquet. Charge applies only to persons not staying at the Biological Station. $3.50 each.	_____	_____
	TOTAL:	_____

Names of others included above:_____

_____

I plan to stay at the _____camp grounds; _____motel; _____station.

Checks should be made payable to "OUBS" and must accompany registration forms. All meals and room charges are payable in advance with this form or at time of arrival at the Biological Station. Meal cards will be issued at the time of check-in. Rooms are limited and will be reserved on a first-come, first-serve basis; housing for married couples and families is very limited.

Mail this form with your check to: SSAR-HL Meeting, Department of Zoology, University of Oklahoma, 730 Van Vleet Oval, Norman, Oklahoma 73069.

DEADLINE FOR RECEIPT OF ADVANCED REGISTRATION IS 15 JULY.

GENERAL INFORMATION

● Registration - All persons attending the meeting are requested to register in advance by completing and mailing the Registration Form (below) before 15 July. Advanced registration is $7.50; registration after 15 July will be $10.00. This fee will pay the cost of refreshments during breaks, the Tuesday night social gathering, part of the banquet, printing, and part of the bus shuttle service. Advanced registration will allow the local committee to plan transportation and housing to serve you best.

● Travel:

Automobile - Excellent highways in the Lake Texoma area and their connections to Interstate 35 (north - south) and east-west Interstates 80 and 40 enhance the accessibility of the University of Oklahoma Biological Station by car from any point in the United States (see map for routes). Exit from I-35 at Marietta, Oklahoma, and travel east on Route 199 to Route 99. Travel south on Route 99 to Willis, Oklahoma, and the University of Oklahoma Biological Station. All major roads to the station are hard surfaced, and ample parking is available. Directional signs are located at road junctions near the station.

Train - Train service is limited, but the Santa Fe Railroad has one passenger train leaving Oklahoma City at 9:25 a.m. daily that arrives at Ardmore, Oklahoma, at 11:38 a.m. Anyone traveling by train must make prior arrangements with Dr. Landreth (or on Registration Form) for shuttle service from Ardmore to the Station.

Bus - Several buses leave Oklahoma City and Dallas for the Lake Texoma area. The closest stop to the University of Oklahoma Biological Station is Marietta, Oklahoma. Shuttle service will be available from Marietta to the meeting; however, please contact Dr. Landreth or complete the Registration Form section on travel to insure that your bus will be met.

	Leaving
Oklahoma City	Dallas
8:30 a.m.	7:00 a.m.
10:00 a.m.	10:00 a.m.
4:00 p.m.	3:40 p.m.
11:05 p.m.	6:30 p.m.

Commercial Plane - Shuttle service will run regularly from the Will Rogers International Airport in Oklahoma City to the meeting. Buses will leave the airport at 2:00 p.m., 7:00 p.m., and 10:00 p.m. on Monday, 14 August. Please indicate your anticipated arrival time on the advanced registration form. Buses will leave from the middle exit of the Baggage Area (lower lobby).

- Exhibits - There will be an exhibit of live specimens. Cages and terraria will be available for the exhibition of unusual specimens. Persons who wish to exhibit live animals (NON-VENOMOUS) should contact Mr. Robert Ball upon arrival at the meeting.

  There will also be a photographic and art exhibit during the meeting. Attendants are encouraged to bring their photographs and art work to the meeting for display. Photos and art work may also be sent to Mr. James R. Purdue, Department of Zoology, University of Oklahoma, Norman 73069, prior to 1 August; materials will be returned by mail or they may be picked up at the end of the meeting. Some mounting material will be available for those bringing photos.

- Social Events - A beer and chips social will be held on Tuesday evening and will be free to all registrants who stay at the Biological Station. A charge of $3.50 for the banquet will be made to campers and others who do not have all their meals in the Station dining room. There are no bars or restaurants serving alcoholic beverages near the Station - B.Y.O.

- Field Trips - Organized field trips will be held on Thursday, 17 August. Sign-up sheets will available at the Registration Desk and box lunches will be provided at a cost of $1.50 per person. Additional information on the trips can be obtained from Dr. Charles Carpenter at the meeting.

- Time - The Biological Station will be on Central Daylight Saving Time in August. Please be sure that all arrival times given for travel arrangements are in CDST.

- Call For Papers - We plan to accept all papers received before the Deadline. Any title received after the deadline can be scheduled only if another paper is cancelled. Please complete the "Call for Papers" form and submit it as early as possible, but before 1 June. Abstracts of papers will be available at the meeting and will be published in HR.

- Deadline - The deadline for receipt of the Call for Papers is 1 June. The deadline for receipt of the Advanced Registration Form and fees is 15 July 1972. After 15 July, the registration fee will be $10.00.

Private Plane - Landing strip facilities are available at the Lake Texoma Lodge for light aircraft. Transportation from this point to the meeting will be arranged at your request.

For Further Information on Travel - Contact:

Dr. Hobart Landreth
Zoology Department
University of Oklahoma
Norman, Oklahoma 73069
Phone: 405-424-3344 Ext. 41

● Communications - The Biological Station mailing address is: Willis, Oklahoma, 73462. The telephone service is through Kingston. The telephone number is (405) 564-2463. All correspondence prior to the meeting should be addressed to SSAR-HL Meeting, Department of Zoology, University of Oklahoma, 730 Van Vleet Oval, Norman, Oklahoma 73069, Not to the Biological Station.

Information on transportation (see above) prior to the meeting may be obtained from Dr. Landreth. Information on the program or accomodations may be obtained from the Zoology Department in Norman at the above address, [Telephone: (405) 325-4821].

● Lodging - Housing at the Station is limited and will be on a first-come, first-serve basis. Only a few apartments for couples and families are available and such groups should plan on camping or staying at motels. The price for rooms is $3.00 per night and includes one set of bed linen and towels. The most economical arrangement is the "package" fee of $20.00 for room and all meals from Monday night through Thursday breakfast.

Motels are available, but none are immediately adjacent to the meeting. Reservations at motels must be made directly by registrants. The following are all within 14 miles of the Biological Station. Rates usually average $6-$12 for a single room, except at Texoma Lodge where "luxury" prices prevail.

Motels in Area

Rooms are usually $6-$8 for a single, $10-$15 double, except at Lake Texoma Lodge where prices are higher. All motels listed are within 20 miles of the Biological Station. There are no motels near the Station. Reservations should be made directly with motel by letter or phone.

NAME	LOCATION	TELEPHONE (Area Code 405)
B & B Motel	Madill, Ok. 73446	165-3610
Boyer Courts	Kingston, Ok. 73439	564-2260
Burge's Motel	Kingston, Ok. 73439	564-2478
Center Motel	Kingston, Ok. 73439	564-2310
Kingston Motel	Kingston, Ok. 73439	564-9906
Lake Texoma Lodge	Kingston, Ok. 73439	564-2311

NAME	LOCATION	TELEPHONE
Lakeview Cabins	Kingston, Ok. 73439	564-2706
Madill Motel	Madill, Ok. 73446	165-3358
Ranger Motel	Madill, Ok. 73446	165-3318
Reed's Motel	Kingston, Ok. 73439	564-2411
Return Motel	Madill, Ok. 73446	165-3382
Willis Motel	Willis, Ok. 73462	564-2745

Campgrounds - There are 28 camping areas on the Oklahoma side of Lake Texoma and reservations are not usually required. The following campgrounds are within 14 miles of the meeting site. Campers may utilize the showers and sanitary facilities at the Station without charge. Due to the limited housing facilities at the Station, camping by family groups is encouraged.

Arrowhead Point - S. of Kingston on SH 70. Picnic facilities, toilets, boat launching ramp, boat rentals, tackle & bait, restaurant (11 miles).

Briar Creek Area - 12 miles S. of Madill on SH 99, then 2 miles W. on county road. 40 acres. Picnic tables, fireplaces, toilets, drinking water, boat launching ramp, fishing. Hospital in Madill. 14 day limit. Operated by Corps of Engineers (5 miles).

Buncombe Creek - S.W. of Kingston. Picnic facilities, drinking water, boat launching ramp (2 miles).

Texoma State Park - 5 miles E. of Kingston on U.S. 70. Picnic shelters, tables, grills, shower/latrines, drinking water, playgrounds, electricity-water-sewage hookups, travel trailer waste section, boat launching ramps, boat rentals, ski-tow service, guide service, enclosed fishing dock, boat dock/storage, marina, ski dock, swimming pool and bathouse. Tennis courts, shuffle board, golf, pro shop, driving range & putting green, horseback riding. Cafe, grocery store, gas, dining & convention halls, youth camp, resort lodge, housekeeping cabins, airstrip--paved, lighted and radio equipped (14 miles).

- Clothing and Laundry - The weather in August is usually hot and dry with occasional thundershowers and only light clothing will be needed. Coin-operated washers and dryers are available at the Station for the use of all registrants.

- Recreation - Recreational facilities at the Station include swimming, row boating, volley ball, horseshoes, ping pong, softball, and fishing. No license for fishing on Station property only. A temproary fishing license for use elsewhere on Lake Texoma is available for $3 in Willis near the Station.

FIFTEENTH ANNUAL MEETING
SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES
held jointly with
THE HERPETOLOGISTS' LEAGUE
University of Oklahoma Biological Station on Lake Texoma
14-17 August 1972

C A L L F O R P A P E R S

Papers on any herpetological subject are welcome. We would prefer that papers presented orally refer to work in progress or nearing completion. Presentation of results that have been published or that are in press usually are a waste of time for both author and audience.

Ordinarily we would expect an author to present no more than one paper, nor to request more than 15 minutes for its presentation. Exceptions will be considered, however.

An abstract of no more than 200 words must accompany this form to qualify for inclusion in the program (see other side). If an abstract is not received, the paper will be treated as a "title only" contribution.

PLEASE NOTE THE DEADLINE: 1 JUNE 1972
(SEE OTHER SIDE FOR ADDRESS)

(PLEASE PRINT OR TYPE)

TITLE: _____

_____

AUTHOR(S): _____

_____

COMPLETE MAILING ADDRESS OF THE FIRST AUTHOR:

_____

_____

TIME REQUIRED: _____ minutes.

EQUIPMENT NEEDED: 2x2" SLIDE PROJECTOR_____
16 MM MOVIE PROJECTOR_____
OTHER: _____

CATEGORY IN WHICH YOUR PAPER SHOULD BE PLACED: Anatomy ( ); Behavior ( ); General Ecology & Life History ( ); Genetics & Populations ( ); Physiology ( ); Techniques ( ); Systematics, Evolution, or Zoogeography ( ); Other ( ).

Is presentation of a paper a requirement for your attendance at the meeting? _____. If yes, does this mean that you will not receive funds or time for travel if your paper is not on the program?_____.

HERPETOL REV 4(2): G APRIL 1972

A B S T R A C T F O R M

Please type the final copy of your abstract in the form provided below. Use the format indicated in the sample: AUTHOR(S) in capitol letters; (institution) abbreviated in parens; and title. The allotted space is adequate for a 200-word abstract.



TILLEY, STEPHEN G. (Smith Coll.). Life history and population structure of Desmognathus ochrophaeus inhabiting wet rock faces.

Populations of the salamander Desmognathus ochrophaeus inhabiting wet, vertical rock faces in the vicinity of Mt. Mitchell, North Carolina were sampled and the information on age at maturity was compiled. Size at maturity was found to increase with increasing elevation and at a given elevation individuals were found to mature at smaller body sizes when they do in nearby woodland populations. Two population level yielded sample sizes sufficient to permit determination of age at maturity and juvenile growth rates from juvenile size-frequency distributions. To the higher elevation, population sexual maturity is attained by delaying maturity about one year relative to its occurrence in the lower population. The juvenile growth rates of the two populations are similar to one another and to those estimated for nearby woodland populations.

USE A CLEAN TYPEWRITER AND GOOD RIBBON. This copy will be offset directly for the published abstract.

An abstract is an abbreviated, accurate representation of a presentation. Make the abstract as informative as possible, so that readers may decide, quickly and accurately, whether they need to obtain additional information. Do not include information given in the title. State the purpose, methods, results, and conclusions, either in that order or with initial emphasis on findings (results and conclusions). Make sure that the taxa of the animals studied are indicated either in the title or the abstract.

Make the abstract self-contained, since it must be intelligible without further information. Be concise without being obscure; retain the basic information and tone of the presentation.

Write most abstracts in a single paragraph. Normally employ complete, connected sentences, active verbs, and the third person. Use nontextual material such as short tables and structural formulas only when no acceptable alternative exists. Employ standard nomenclature, or define unfamiliar terms, abbreviations, and symbols the first time they occur in the abstract.

[Adapted from, "Proposed American National Standard for Writing Abstracts." International Council of Scientific Unions Abstracting Board. -- HGD.]

AUTHOR(S):

TITLE:

ABSTRACT:

PLEASE CUT ALONG THIS LINE SEND ENTIRE PAGE

SEND YOUR ABSTRACT BY 1 JUNE direct to:

Irene Palser
HERPETOLOGICAL INFORMATION SEARCH SYSTEMS
American Museum of Natural History
New York, N. Y. 10024

DOWLING,H.G., T.C.MAJUPURIA and F.W.GIBSON
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CAT AMER AMPHIB REPT 1971:107.1-107.3, map.

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Turtle Bill of Health

ALBANY (AP)—The State Public Health Council has ruled that as of July 1, merchandisers of pet turtles will have to prove to the Dept. of Health that their turtles are free of salmonella baeteria.

NEW YORK POST
7 March 1972

Wildlife Plague[sic]

LAKE APOPKA, Fla. (AP) — A mysterious wildlife plague is spreading through some of central Florida's fresh waters, killing thousands of fish and dozens of birds. Sixteen alligators have also died.

For the first time now, game wardens report finding the bodies of egrets, crows and seagulls as well as extensive shad and catfish kills.

Officials said the path of wildlife destruction, which began a month ago, was edging northward from Lake Apopka through about seven miles of algae-choked canals to Lake Dora.

Game and Fresh Water Fish Commissioner Dr. Earle Frye said he is sending a team of biologists to Lake Apopka—which straddles the Lake-Orange County line — for intensive emergency studies.

"We're concerned the die-off has now extended to other species of wildlife," said Frye.

At first biologists thought the die-off was attributable to alligators eating dead and rotting fish. Then a DDT theory was pursued. But scientists found more pesticide in live and apparently healthy gators than in the dead ones.

NEW YORK POST, WEDNESDAY, JUNE 9, 1971 50

Indict Dealer In Shipping of Alligator Skins

A Georgia businessman was indicted by a federal grand jury here yesterday on charges of shipping 4,788 alligator skins to New York in violation of laws to protect the vanishing reptiles.

A seven-count indictment accused Atlanta merchant Quince Clayton Plott, owner of the Q.C. Plott Raw Fur and Ginseng Co., of profiting from the poaching of alligators. The nearly 5,000 skins he sent here in 1969 and 1970 had a wholesale value of $92,587, the indictment said.

It's a First

U.S. Attorney Whitney North Seymour Jr. said the indictment is the first of its kind in New York and one of the first attempts the federal government has made to prosecute persons defying laws designed to save endangered wildlife.

Seymour said Plott knew the alligator skins "were obtained unlawfully by poaching." According to the indictment, the hides were "taken, transported and sold in violation of the laws and regulations of the state of Georgia."

Could Get 70 Years

Plott was charged with violating the Lacey Act—a federal law banning the interstate transportation and sale of any form of wildlife that is protected under any state law.

If convicted, he could receive a maximum sentence of 70 years in prison and a $70,000 fine.

27 • DAILY NEWS, THURSDAY, MARCH 9, 1972 •

Geological Abstracts

SIR,—The article, "Abstracts Abandoned" (*Nature*, 234, 167; 1971), contains sufficient contradictions and confusion to require comment. The US Geological Survey publications that will be suspended at the end of 1971 are not providing, as indicated by their titles (*Abstracts of North American Geology* and *Geophysical Abstracts*), comprehensive bibliographic coverage of the literature but only about 30 per cent of it. The Geological Society of America's *Bibliography and Index of Geology*, a product of the American Geological Institute's GEO-REF system, publishes over double that amount of deeply indexed and annotated citations in twelve monthly issues plus an annual cumulative author and subject index under hard covers. This was a major consideration in the Survey's final decision to suspend publication in favour of one English-language bibliography that would contain references to the world literature rather than parochial coverage by discipline, mission, or territorial division. Moreover, in conversations between the Survey and AGI prior to the decision, it was agreed that GEO-REF and the GSA Bibliography would increase their coverage at least to include all of the North American and geophysical material heretofore contained in the suspending publications.

The $10 a year price of the *Abstracts of North American Geology* was completely artificial as anyone producing bibliographies must realize. It was originally based on the cost of a print overrun only, beyond the requirements of the Survey's internal free distribution. As such, it was cheaper than Professor Clayton's *Geographical Abstracts* and Dr Howie's *Mineralogical Abstracts*. Had it been priced realistically, it might still be publishing.

As to the $250 price tag on the *Bibliography and Index of Geology*, it is too bad that the geological community has never accepted the value of information as have the chemists, biologists, and physicists. This is particularly unfortunate as the geologists' use of their archival information is much greater than the use made in other disciplines. They may have to accept it in the future or do without when State funding agencies run out of money or patience, or both. In any event, the *Bibliography* is less expensive than the *Bibliographie des Sciences de la Terre*, the only comparable geological publication in the western world, and cheaper by an order of magnitude than the chemical, biological, and physical counterparts.

We, at GEO-REF, work very closely with both the Bureau de Recherches Geologiques et Minières and the Centre National de la Recherche Scientifique, the producers of the *Bibliographie des Sciences de la Terre* and the *Bulletin Signaletique* and have great respect for their publications. Nevertheless, I fail to see the compensation that the combined French-language service will provide for English-speaking geologists. They do not (and will not so far as I know) even satisfy Professor Clayton's passion for abstracts. We are also receiving cooperation in our bibliographic work from CSIRO in Australia and have plans for input from Europe, including an exchange with BRGM and CNRS. We would welcome a contribution from the UK, but it would have to be of better quality than one we received from there in 1967 and 1968.

Finally, may I call to your attention that the GEO-REF bibliographic service not only produces the printed *Bibliography and Index of Geology*, but it is the only comprehensive service in geology (in any language) that is distributing tapes to data centres, libraries, and universities for computer searching. We are also providing the annual indexes for a dozen primary journals, producing ten volume cumulative indexes for certain serials, and are providing the material for special topical bibliographies such as the *Bibliography of Coal in Kentucky*, published by the Geological Survey of Kentucky, and the *Bibliography and Index of Micropaleontology* which is being published monthly by the American Museum of Natural History. We are seeking further uses of our tape file and are formulating plans for inputting the historical data of geological literature starting in the mid-nineteenth century.

Yours faithfully,

JOEL J. LLOYD
American Geological Institute,
2201 M Street NW,
Washington DC 20037

NATURE 235 (5337): 347
11 February 1972

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Membership is open to anyone who is interested in amphibians and reptiles.

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Write: H. G. DOWLING
Department of Herpetology: HISS
Amer. Museum of Natural History
New York, NY 10024

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HERPETOLOGICAL REVIEW publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals. Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome.

FORMAT. Manuscripts should be type-written on white bond paper, one side only. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and the animal group(s) included. Use standard abbreviations for journals.

The 1971 YEARBOOK OF HERPETOLOGY (published by HISS) contains a list of American Standard abbreviations for some 2,500 journals. Other publications that will be of assistance in the preparation of manuscripts are:

CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES (see information on this page).

Common names for North American amphibians and reptiles (COPEIA 1956(3): 172-185).

SCIENTIFIC WRITING FOR GRADUATE STUDENTS, by F. Peter Woodford (Rockefeller Univ. Press, New York, NY 10021). $5.75.

STYLE MANUAL FOR BIOLOGICAL JOURNALS (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, DC 20016). $3.00.

A publication that will be found helpful in planning and producing adequate illustrations is:

A HANDBOOK OF BIOLOGICAL ILLUSTRATION, by Frances W. Zweifel (University of Chicago Press, 58th Street at Ellis Avenue, Chicago, IL 60637).

Line-cuts are photo-offset directly with the text, and should have widths of 4 1/4 inches (one column) or 9 1/4 inches (two columns). Each line of illustration equals six lines of text (full page copy length is 12 3/4 inches). Line cuts are reduced about 25 per cent in processing.

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

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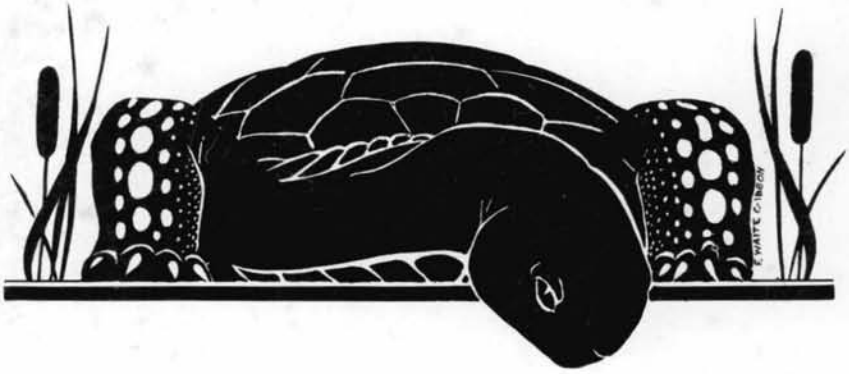
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herpetological REVIEW

THE NEWSLETTER ON AMPHIBIANS AND REPTILES...
AND THE PEOPLE WHO STUDY THEM

VOLUME 4, NUMBER 1
FEBRUARY 1972

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Herpetological Review

Produced for the

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

and the

HERPETOLOGISTS' LEAGUE

by

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In 1971 it had 900 members and fellows (including Life and Honorary members), and more than 400 institutional subscriptions to its journal, HERPETOLOGICA, which has been published continuously since 1936.

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Herpetological Review

VOLUME 4, NUMBER 1

FEBRUARY 1972

NEWS AND ANNOUNCEMENTS

3 SECOND REPORT FROM THE JOINT COMMITTEE FOR COOPERATION.

4 CALENDAR
Individuals and Institutions.
5 LAKE TEXOMA MEETING: preliminary announcement; Job Openings; Members' Desiderata.
10 Proposed Speakers Bureau and Film Service.
11 A question on California Dealers.
24 Profile of the ASIH -- and a photograph.
12 GRANTS & AWARDS: World Wildlife Fund; National Geographic Society; Sigma Xi.
13 SSAR CATALOGUE: in need of authors.

REGIONAL SOCIETY NEWS

6 First Joint Meeting of the East Coast Herpetological Societies (New York).
7 Joint Meeting of ECHS, HL, and SSAR in Philadelphia.

8 The Michigan Society of Herpetologists.
The Kentucky Herpetological Society.

9 Northern Virginia Herpetological Association.
Butte County Turtle and Tortoise Association.

10 Maryland Herpetological Society: 1972 Schedule

11 California Turtle & Tortoise Club: Westchester Chapter.
HERPETOLOGY and HERPETON, publications of the Southwestern Herpetological Society.

DEPARTMENTS

2 EDITORIAL: new and revised HR format.
LETTERS TO THE EDITOR: Lazell on "Unreviewed."

14 REPORTS: Groves & Groves on a trash-injured kingsnake.
HERPETOLOGICAL HUSBANDRY
15 African Rock Python.
17 Nile Crocodile.

CONSERVATION
19 Geometric Tortoise.
20 Santa Cruz Long-toed Salamander.
23 GEOGRAPHIC DISTRIBUTION: New Records.
Dobie on Graptemys localities.

SOCIETY NOTES

MASTHEAD and MEMBERSHIP INFORMATION (inside covers).
14 LOST MEMBERS

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EDITORIAL

Something of a new look is introduced with this number of HERPETOLOGICAL REVIEW. Most of the differences from previous issues are intentional. One is unintentional.

To get the latter out of the way first, the CURRENT HERPETOLOGICAL TITLES section is omitted from pressure of circumstance. During the last half of 1971 the various dock strikes held up receipt of foreign journals, causing us to publish a number of short lists. When the New York strike ended, we were so inundated with such journals that they held up final processing of the list for HR 4(1), and amplified it to something more than 40 pages of titles alone. It seems better, therefore, to go ahead with the publication of articles and news items in this issue, and to reserve HR 4(2) mainly for "current titles."

You also will notice the absence of UNREVIEWED-UNEDITED COMMUNICATIONS. This is not accidental, but was voted by the SSAR Board in August. It was the majority belief that this experimental section, though appreciated by many, might tend to draw research articles that could better be published in established journals.

However, the HR format introduced here does provide for the reporting of data (as distinguished from research studies) in a number of different sections. It also reflects some of the suggestions that came in with last year's poll of members.

We would like to run more NEWS of individuals and institutions. In order to do this, however, we must have individuals that will send in such news. Fortunately, there is considerable news from regional societies that can be reported in this issue. We are happy also to report the establishment of three new special sections.

HARVEY POUGH (Cornell University) has agreed to edit a section of PHYSIOLOGICAL MISCELLANEA in the general style of George Zug's GEOGRAPHIC DISTRIBUTION section. He will attempt to consolidate information on such things as temperature records and activity periods, and to publish them in a concise form.

A similar section on LIFE HISTORY DATA, in which we hope to consolidate brief reports on laying and birth dates, clutch sizes, and other critical data of this sort, will be edited by HARRY GREENE, of the University of Texas at Arlington.

A somewhat different section is HERPETOLOGICAL HUSBANDRY. We have discussed the initiation of an animal care section for some time, and it is finally introduced with this issue. We hope to have contributions from many different sources for this section, and we intend to offprint the best ones for wider distribution to the public -- and for possible later collation into a handbook. This section will be edited by JAMES MURPHY of the Dallas Zoo.

Finally, a general REPORTS section will continue to publish data on techniques, karyotypes, and other subject material not included in the special sections.

We invite contributions to, and comments on all of these sections. -- HGD.



LETTERS TO THE EDITOR

CONSERVATION EDUCATION RESEARCH

MASSACHUSETTS AUDUBON SOCIETY
LINCOLN, MASSACHUSETTS 01773 • TEL. 617-259-9500

July 30,1971

The Herpetological Review
American Museum of Natural History
Central Park West at 79th Street
New York,New York 10024

Dear Sirs:

The phrase "unreviewed - unedited" is a bald-faced, flat-out lie.

My paper on triploid Ambystoma was reviewed in detail by at least Dr. H. G. Dowling, who required me to cut it to make it acceptable for publication. It was severely edited in terms of layout, especially messing up the section of my summary arguments.

And to what avail? To save space? To save space for a block print of an imaginary lizard centered in a near-empty column? Idiocy!

You guys should stick to counting scales and get a real editor. With a sail like you, who needs an anchor?

Sincerely yours,

James D. Lazell
Staff Herpetologist

JDL:EG
Enc.

[Published as received. -- HGD.]

SECOND REPORT FROM THE JOINT COMMITTEE

FOR COOPERATION OF THE HERPETOLOGISTS' LEAGUE

AND SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The committee met for a total of seven hours on 27 and 29 December 1971 during the AAAS meeting in Philadelphia. A detailed analysis of the financial records of both societies showed that each had ended the year in good financial condition. A lengthy examination of financial models and possible dues structures of an amalgamated society revealed that financial considerations alone would not prevent a merger and that an amalgamated society could be operated on a sound monetary basis to provide continued services to the herpetological community.

The committee recommended that all present publications of the two organizations be retained with HERPETOLOGICA as the major journal for papers and the JOURNAL OF HERPETOLOGY as a serial for the possible publication of monographs and taxonomic papers. Three categories of memberships and dues were suggested: Sustaining, to receive all journals; Regular, to receive HERPETOLOGICA, HERPETOLOGICAL REVIEW, and possibly the facsimile reprints; and Associate, HERPETOLOGICAL REVIEW. The middle category of membership would be structured to provide equal or increased services to present regular members of the two societies. The committee recognized the moral commitment to continue services to life members; those holding life membership in only one society would receive the services of regular membership and persons holding life memberships in both societies would receive the service of sustaining membership in a merged organization. We must emphasize that no final recommendations on dues and membership categories have been made, but are under intensive study. Detailed recommendations will be presented in later reports, with a final report to be given at the Lake Texoma meeting in August and published in the following issue of HERPETOLOGICAL REVIEW.

The important philosophies and "intangible attributes" of the present societies were discussed and the committee agreed that the best of these must be continued in any new organization. For example, the unwritten but recognized policy of SSAR to hold late summer annual meetings at locations where low costs would encourage students and non-professionals to attend must be continued. Paper sessions and council meetings at other times of the year could also be scheduled to coincide with national or regional meetings of other societies. Sincere efforts to provide services to regional herpetological societies and to encourage participation of non-professionals would be made by an amalgamated organization. The committee believes that one society representing herpetology could speak with a stronger voice on conservation and similar matters of interest to the membership.

The alternatives to formal merger are many. These include a continuation of the two societies with the present level of cooperation, with increased joint efforts, or with no combined undertakings. There are obviously many pros and cons to a merger and the committee will attempt to outline these in the next report due to be published in the next issue of HERPETOLOGICAL REVIEW. At this time the majority of the joint committee believes that a merger is feasible and that continued study of the details is required.

A panel discussion on the pros and cons and the details of a merger will be held at the Lake Texoma meeting on 15 August. Within one month after the meeting a ballot will be sent to the memberships of both societies for vote on amalgamation. A merger would take place on 1 January 1973 only if a majority of the membership of each society approved. A nomination committee from the two societies would present a ballot for officers for the new organization. The proposed constitution and by-laws, details of membership categories, the operating philosophy, and pros and cons will be provided to the memberships by publication in HERPETOLOGICAL REVIEW or by direct mailing prior to any formal vote.

The committee continues to solicit comments, questions and expressions of concern on any item to be considered in a possible amalgamation. These may be sent to the Chairman or to any committee member.

Kraig Adler, Herndon G. Dowling, Robert E. Gordon, Hobart F. Landreth, Clarence J. McCoy, Henri C. Seibert, Wilmer W. Tanner, and Victor H. Hutchison (Chairman).

MEETINGS AND SOCIETIES

CALENDAR 1972

9-14 April....FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, 56th Annual Meeting, Atlantic City, NJ.

13-17 April....SOUTHWESTERN ASSOCIATION OF NATURALISTS, Annual Meeting, Texas Tech. University, Lubbock, Texas.

18-23 June.....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Boston.

July.....SALAMANDER SYMPOSIUM, Highlands Biological Station, North Carolina.

14-17 August...Combined Meeting: HERPETOLOGISTS' LEAGUE and SOCIETY FOR THE STUDY OF AMPHIBIANS and REPTILES, University of Oklahoma Biological Station, Lake Texoma.

September....INTERNATIONAL SOCIETY ON TOXINOLOGY, General Meeting, Institute of Organic Chemistry, Darmstadt, West Germany.

24-30 September...INTERNATIONAL CONGRESS OF ZOOLOGY, Monaco.

26-28 December....HERPETOLOGISTS' LEAGUE, Annual Meeting (Cosponsored by the SSAR), Washington, D.C. (with AAAS).

CALENDAR 1973

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, San Jose, Costa Rica.

4-11 August....FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

CALENDAR 1974

June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Ottawa, Canada.

NEIL D. RICHMOND has been named Curator of the newly-established Section of Environmental Studies at the CARNEGIE MUSEUM. This section will function as an ecological and environmental information center, and a coordinating agency for ecological studies. CLARENCE J. McCOY replaces Richmond as Curator of the Section of Amphibians and Reptiles.

JOSEPH F. GENNARO has been awarded tenured status at NEW YORK UNIVERSITY.

The AMERICAN MUSEUM OF NATURAL HISTORY again invites applications for small grants to cover investigations on the North American fauna. Most of the awards have been made for support of field work, but trips to study collections at the AMNH are also supported. Application forms can be obtained from:

Theodore Roosevelt Memorial Fund, AMNH
New York, NY 10024

JAMES R. GRISSOM (Arkansas State Univ.) received his M.S. degree in 1971 with a thesis on, "Electrophoretic Study of Serum Proteins in certain Plethodon Salamanders."

KENNETH R. PORTER (Denver Univ.) is studying a population of Rana pipiens with a high incidence of blue individuals.

RICHARD M. BLANEY (Louisiana State Univ.) received his Ph.D. degree in 1971 with a dissertation on the systematics of the kingsnake, Lampropeltis getulus.

RICHARD THOMAS (LSU) visited Peru and Haiti in his continuing studies on Antillian typhlopid snakes.

GARY EBERLY (LSU) is studying the chromosome morphology of New World natricine snakes.

CRAIG JURATSCH (Lab. Neurological Research, Univ. Southern California, Los Angeles) is conducting work on immunity in snakes to various snake venoms in an attempt to determine the cellular mechanism involved.

RICHARD SCHAEFFER (LNR, USC) is studying the enzymatic components of snake venom glands (especially crotalids).

FRED BUESS (LNR, USC) is conducting studies on the definitive mechanism by which crude Crotalus venoms produce their deleterious effects on hemodynamics.

JACOB DUBNOFF and FINDLAY E. RUSSELL (LNR, USC) are conducting a series of physiopharmacological and biochemical studies on the proteins and peptids of the venom of Crotalus viridis helleri.

JOB OPENINGS

We are looking for new staff members to broaden our faculty resources in animal ecology and limnology. The areas in which we are especially interested are the following: systems ecology; animal ecology with a background in HERPETOLOGY, or in soil invertebrates; limnology with special interest in aquatic systems, or in plankton, or in water physics and chemistry.

The appointments will probably be made at the rank of Assistant Professor in the Department of Zoology and Entomology. The responsibilities of the new members will include teaching in general ecology and related courses at the undergraduate level, participation at times in the introductory course of General Biology or General Zoology, and teaching and supervision of graduate students in our interdepartmental Graduate Program in Ecology. His research program will be one of his own choice.

I will appreciate your cooperation in notifying suitable individuals of these opportunities. Please advise any person who is interested to write me, sending a summary of his background, experience, and interests.

James T. Tanner, Director
Graduate Program in Ecology
UNIVERSITY OF TENNESSEE
Knoxville, TN 37916

MEMBER'S DESIDERATA

TIMOTHY S. DOYLE (Autumn Lane, Carlisle, MA 01741) would like to hear from readers who have seen or collected "double" turtle eggs (one egg, the size of two hitched together), especially those of Chelydra and Emydoidea. He is also anxious to acquire hatchling or young specimens of Emydoidea blandingi for use in a growth study. A trade or purchase can be arranged.

TIMOTHY S. DOYLE

Autumn Lane
Carlisle, MA 01741

PRELIMINARY ANNOUNCEMENT

J O I N T M E E T I N G

SOCIETY FOR THE STUDY OF AMPHIBIANS
AND REPTILES
and the
HERPETOLOGISTS' LEAGUE
14-17 August 1972

The Annual Meeting of the Society for the Study of Amphibians and Reptiles will be held at the University of Oklahoma Biological Station at Lake Texoma from 14-17 August. The meeting will be co-sponsored by the Herpetologists' League. The theme of the meeting will be "The Future of Herpetology," and a panel discussion on the feasibility of an amalgamation of the two societies will be an important part of the sessions.

The evening of 14 August has been reserved for board and committee meetings, a beer social will be held on the evening of 15 August, and a banquet on 16 August. Paper sessions will be scheduled during the day on 15 and 16 August, and field trips will be organized for 17 August. The costs for those attending will be $7.50 pre-registration ($10 at meeting), $8.00 per day for room and meals, and $5.00 per day for meals only. The costs of the social and banquet are included in the registration and room fees.

Rooms for families and couples are very limited and members are urged to consider camping at nearby campgrounds. Shower and sanitary facilities of the Biological Station will be available for campers.

Registration forms, calls for papers, and detailed information on the meeting will be published in the April or June issue of HERPETOLOGICAL REVIEW.

The local committee for the meeting consists of Drs. Hobart Landreth, Charles Carpenter, and Victor Hutchison (Chairman), University of Oklahoma, Norman, Oklahoma 73069.

EASTERN SEABOARD SOCIETIES

FIRST JOINT MEETING OF THE EAST COAST HERPETOLOGICAL SOCIETIES

On October 9, 1971 more than 180 delegates and members representing herpetological societies from the Virginias to Boston assembled at the Staten Island Zoo in New York to attend the first EAST COAST HERPETOLOGICAL SOCIETIES CONVENTION. Carl Kauffeld, Director of the Staten Island Zoo, served as host and the New York Herpetological Society served as the sponsoring organization.

Carl Kauffeld in his welcoming address, emphasized that the conservation role of our societies is one of the main reasons for their existence. Speaking of today's larger reptile societies Mr. Kauffeld warned that with an increase in the number of "fans" there could be an increase of danger to what we want to protect and study. His advice is to keep the number of specimens down, NO OVER-COLLECTING! Exhibit an empty case with the label reading "Extinct" or "Almost Extinct", rather than show off an almost extinct specimen in a collection. It is a matter of self-discipline, Mr. Kauffeld stated.

Robert Tuck, President of the Maryland Herpetological Society, represented the two Virginia herpetological societies and the M.H.S. Mr. Tuck, working on legislation for endangered species has formed a "Bog Turtle Committee," which is studying the status of this species, which is especially threatened by the destruction of its habitat and over-collecting. Mr. Tuck intends to present his ideas to his Congressman.

Malvin L. Skaroff, President of the Philadelphia Herpetological Society, stressed the importance of legislation for endangered species in Pennsylvania and New Jersey. "The P.H.S. is still alive and well," Mr. Skaroff stated, announcing that the next issue of the PHS-Bulletin would be in print soon. The PHS has worked out a plan to aid the new Reptile House of the Philadelphia Zoo in the purchase of live specimens. Mr. Skaroff asked other societies to join the fund-raising for the zoo's collection.

The Connecticut Herpetological Society was represented by George T. Vesper, President, and 15 members. One of the plans of the C.H.S. is to arrange a Herp Show for the public in a public institution. Mr. Vesper suggested the establishment of a bulletin exchange program within the regional societies.

Dave Hulmes, President of the New York Herpetological Society, introduced Ernst G. Hofmann as Senior Editor of the NYHS Bulletin "Herp". Ernst Hofmann pleaded for more active participation of the membership body in submitting articles, illustrations and photos for HERP. Dave Hulmes briefed the audience on the society's educational program in New York City Schools. The 1971 presentation of the program was again highly rated by the education administrators and teachers. This type of work is an excellent way to introduce students and teachers to herpetological conservation ideas. The NYHS is planning to expand the program to other school districts in New York and New Jersey.

Dr. Herndon Dowling, Director of Herpetological Information Search Systems (HISS), spoke on the "Crisis in Herpetological Literature Today". Dr. Dowling expressed the need for closer cooperation between professional and regional societies. In 1971 over 4,000 articles and papers published throughout the world were screened and sorted for the IBM and microfilm files at the HISS office at the American Museum of Natural History. The proposal for 1972 is to provide and initiate specific information service in Herpetological Review, co-sponsored by the Herpetological League and the SSAR, to form a "National Newsletter". The HISS program, supported by the National Science Foundation, is in need of support by the regional societies. The availability of herpetological information and literature is a vital factor in the research operations of regional societies.

John Behler, Assistant Curator of Reptiles at the Bronx Zoological Park, spoke on "Endangered Reptiles and the Law". It is the crime of our ancestors to have committed this ecological plunder for commercial interests in the name of (shortsighted) "progress," Mr. Behler stated. A Corps of Engineers with sophisticated tools, expert land developers and pesticides have created ecological destruction to promote the human population explosion.

Mr. Behler showed figures from the 1969 records on imports of exotic animals into the U.S. Tropical fish imports hold the top with 73,000,000. Second are the reptiles with 1,390,000 and amphibians appear with 400,000 on the list. The combined figures on mammals and birds stand at approximately 1,500,000. Aside from these legally-imported live animals, it is estimated that at least 10% can be added for animals which entered the states illegally.

The importation of mammalian and reptilian hides is still going strong, although valid export permits from the country of origin are required. The problem lies in the lack of qualified inspection personnel at the entry ports. It is almost impossible, even for an expert, to determine the species by examining a crocodilian hide. There is reluctance by the fashion industry to accept regulations or impose restrictions on a voluntary basis because of the fear of competition among themselves. Only an alert public can avoid the slaughter of endangered species by refusing to buy the products fashioned from these animals! Mr. Behler's

talk was most informative and followed by a lengthy discussion with strong statements by the audience.

After a break for dinner, the Staten Island Zoo's reptile wing was opened for a viewing of the fine collection of reptiles and amphibians. When all were reassembled in the auditorium, the program continued with speakers representing several of the participating societies.

Robert Tuck, Jr., President of the Maryland Herpetological Society, and staff member of the Smithsonian Institution, took us to the Caribbean. First to Jamaica, in quest of the rare tree frog Hyla lichenata. After many hours of tracking and listening, and a few bumps and bruises, one of the elusive giants was captured. The next stop was Tobago where more interesting reptiles and amphibians were photographed and perhaps a new species of frog discovered by Mr. Tuck.

Finally we climbed El Touche in Trinidad to find the beautiful little frog Amphodus auratus. This frog is now endangered due to the destruction of its very limited habitat, a certain type of bromeliad found on that mountain in Trinidad. Bob's amusing anecdotes were a pleasure to all.

Dr. Norman Scott, Professor of the University of Connecticut and advisor to the C.H.S. followed by taking us to the country of Costa Rica, a land of varied terrain and climate. We were shown the almost temperate deciduous forests of the northwestern area and the tropical rain forest of the southern and Caribbean slopes. Dr. Scott's superb color slides illustrated the great variety of amphibians and reptiles in this beautiful country.

To bring this most eventful day to a close, we returned to our own southeastern area. Robert Zappalorti, staff member of the Staten Island Zoo, representing N.Y.H.S., guided us through the Okeetee Preserve in South Carolina. Bob, being aware of the great need to conserve our indigenous fauna, collects and relocates every year countless numbers of snakes of various species found in the area. The snakes are collected in the open burned sections and released in the unburned areas where they can take cover, thus being protected from capture by the vast number of collectors that invade the preserve every spring. Bob's excellent selection of color slides illustrated the work of a conservationist trying to preserve an area rich in species of reptiles and amphibians, but with fewer specimens seen each year. His kind of "collecting" will assure that the snake enthusiast of the future will be able to observe a beautiful Corn snake, Scarlet kingsnake, or perhaps a large Diamondback rattlesnake in its natural habitat.

So ended the First East Coast Herpetological Societies Meeting. (From notes for NYHS BULL 7(3/4)).



GROUP AT THE STATEN ISLAND MEETING. -- Top (L to R): Ron Reeves (2nd VP, NYHS); George Meyer (Treas., NYHS); Malvin Skaroff (Preas., PHS); Robert Tuck, Jr. (Pres., MHS); Herb Herman (Advisor, NYHS); Jeremy Jacobs (Secty., MHS); Peter Wemple (VP, MHS). Bottom (L to R): Rene Katz-Braunschweig (Advisor, NYHS); H. G. Dowling (Advisor, NYHS); George Vesper (Pres., CHS); Dave Hulms (Pres., NYHS); John Behler (Asst. Curator Herpetol., NYZS); Norman Scott (Advisor, CHS); Itzchak Gilboa (HISS).

JOINT MEETING OF EASTERN SEABOARD HERPETOLOGICAL SOCIETIES, HERPETOLOGISTS' LEAGUE and S.S.A.R.

On December 28, 1971 approximately 200 people attended a meeting sponsored by the Philadelphia Herpetological Society at the New Reptile House at the Philadelphia Zoo. Timed to coincide with the annual meeting of the Herpetologists' League and the Society for the Study of Amphibians and Reptiles, the meeting called together the Philadelphia, Maryland, New York, Virginia, Northern Virginia, and Connecticut Herpetological Societies.

After greetings by Dr. Roger Conant and representatives of the various societies, Dr. Wilmer W. Tanner, President Herpetologists' League, Dr. Robert Gordon, Chairman, SSAR, Robert Tuck, President, Maryland Herpetological Society, Frank Watrous, President, Virginia Herpetological Society, Ted Feuerback for North Virginia Herpetological Society, and Malvin L. Skaroff, President of the Philadelphia Herpetological Society, there was a tour of the new reptile facility. Lunch was served by PHS, after which all returned to the Benjamin Franklin Hotel where a session was held for the reading of scientific papers.

On Wednesday a business meeting was held, at which time a report was given on the proposed merger of SSAR with the Herpetologists' League. There will be other joint meetings at the University of Oklahoma Biological Station, Lake Texoma, Oklahoma in August 1972, and at Washington, D.C., in December 1972.

This was an occasion where the professional and local or amateur societies met together in a good cooperative spirit. We hope that such cooperation may continue and become quite fruitful in days to come. - MLS.

MICHIGAN SOCIETY OF HERPETOLOGISTS

Before I had a chance to report about the activities of the Great Lakes Herpetological Society, it became extinct. I was informed in a recent letter from the president of the Michigan group (Horace G. Stafford, MSH, 754 W. Shepherd St., Charlotte, MI 44813) that their new group is active and organized. Here are some of their activities. They are devoted to the study, appreciation and preservation of amphibians and reptiles. It is an homogenous group in which long-haired college men serve on committees with older, retired gentlemen without a trace of a communication gap.

People join for two reasons: interest in keeping live specimens and/or interest in research. Those who join as keepers eventually find themselves intrigued and active in research projects.

Their biggest all-member undertaking now is to locate and record data on a residual colony of the Red-bellied Watersnake, Natrix erythrogaster neglecta which is located in Calhoun County. This is being done at the request of Dr. Sherman Minton of Indiana University. They are classifying and narrowing down information given by Dr. Speare of Olivet College, Dr. Hensley of Michigan State University, and Dr. Charles Walker of the University of Michigan.

The group runs six school programs in Michigan for science classes which have resulted in a changed attitude of hundreds of young people towards herptiles. They use live specimens, and spend the majority of the time encouraging youngsters and answering their questions.

Members can borrow periodicals and books from the Society library, and in fact, two junior high students, Bill Zajac and Tim Hey, seem to have memorized most of Conant's Field Guide.

Horace G. Stafford and Bob Hickman are working on a set of study plans which they want to present to the biology teachers of Michigan at their meeting this spring at Mt. Pleasant.

All these activities are starting to press the Society financially because travel expenses come from the personal resources of the individuals who volunteer for the particular project. I hope that a new amalgamated national society will be able to provide the necessary aid in guidance, monies, films and speakers to a group so active and fulfilling so important a niche. - IG.

KENTUCKY HERPETOLOGICAL SOCIETY

The KENTUCKY HERPETOLOGICAL SOCIETY is a young organization. It was formed in the spring of 1969 in the Louisville area. Monthly meetings with planned programs are held on the third Sunday of the month at the Louisville Zoological Gardens. The Society publishes a monthly newsletter named, The Kentucky Herpetologist.

The Society's primary goal is the conservation of Kentucky's herpetofauna. Working toward this goal, the KHS has been involved in various activities, including giving numerous educational talks to small groups and participating in programs on the local educational T.V. network.

Working with the Kentucky Humane Society and the Louisville Zoological Gardens, the KHS has sought to aid those reptiles and amphibians which are held captive. When captive animals are received, local species are released into a congenial habitat, and homes are found for exotic specimens. The Society also tries to help captive herps by giving advice and assistance to their keepers.

Other activities of the KHS include field trips and social get-togethers. Public displays of living specimens are set up sporadically with the cooperation of area schools and merchants. Efforts are also made to aid individuals working on research projects.

Membership in the KHS is open to any individual seriously interested in herpetology. Individual dues are $3.00 per year ($2.50 for students). Visitors are always welcome at meetings. For further information, contact either William T. Mobley (935-4393) or Eddie M. Ashmore (968-6548) or write: The Kentucky Herpetological Society, c/o Eddie M. Ashmore, 5303 Barnes Drive, Louisville, Kentucky 40219.

HAPPY BIRTHDAY TO YOU, NVHA

The Northern Virginia Herpetological Association, now 3 years old, was formed to provide an opportunity for persons concerned with herpetology to further their interests in association with other like-minded individuals.

Meeting once a month, NVHA attempts to address itself to all phases of herpetology. All taxonomic groups and geographical areas fall within the Association's scope. Though meeting in the northern Virginia area, the organization welcomes members from throughout Greater Washington. Interested younger people are encouraged to join. Open to all age groups, the Association particularly welcomes those individuals having a more mature interest in herpetology.

NVHA is especially concerned about informing its members and the general public as to the nature and significance of reptiles and amphibians, their role in the environment, and the need for conservation. Proper care in captivity, as well as the natural history of wild populations, is dealt with. Since a major role of the group is education, interest and enthusiasm are the major prerequisites for membership; there is no need to be a specialist in the field.

The meetings provide a structure for the active interchange of information. Guest speakers and members of the Association present frequent programs. In addition, there are "clinic" sessions aimed at solving problems related to captives, including feeding and disease problems and assistance in identification. Current literature in the field and many other subjects are discussed. Field trips for observation purposes are scheduled when practicable. A Bulletin, which appears at irregular intervals, is free to members.

For additional information write to: Frank T. Watrous, 1201 S. Court House Rd., Arlington, VA 22204



BUTTE COUNTY T & T ASSOCIATION

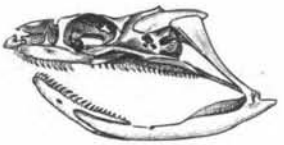
"...There is a new Northern California Club -- it is the Butte County Turtle and Tortoise Association. They meet on the Chico State College Campus. When in the Chico area, call Sean McKeown at (916) 345-6527 for information, or leave your name and phone number with the Secretary for the Department of Biological Sciences at Chico State College...."

Their Notes and Announcements is called "Turtle Droppings." The first meeting was held September 24 and was an overwhelming success. Dan Emery, Secretary, gave a presentation and slide show on "Color Variation in the Northwestern Pond Turtle (Clemmys m. marmorata)." George Green, member from Arbuckle, CA, initiated a project to inform dorm coeds as to proper techniques in care and feeding of the baby pet turtles they keep in their rooms. Among these are: common sliders (P. s. elegans) and P. c. concinna, the river cooters. Club members are setting up a box turtle exhibit in the Biological Sciences Building.

No notes on dues or frequency of publication of meeting notes were made, but get in touch with this new association through Sean McKeown, President, Butte County Turtle and Tortoise Assoc., 112 Shasta Hall, Chico, CA 95926. (from Tortuga Gazette).



FIGURE. Physalaemus pustulosus calling while floating in the water. [Photo by Franco Peñalba, courtesy of Jaime Villa.]



FILMS AND LECTURERS

I have received a number of requests from groups new and old, to provide and advise on availability of films and lecturers as suitable programs for regional society's meetings.

Speakers bureau

For a continuing viability of the various regional societies, it seems obvious that the most important thing necessary is the regular presentation of interesting and informative programs at meetings. I feel that by capitalizing on SSAR and HL membership in the same region, we can make willing and qualified lecturers more readily available for the meetings of the regional societies. If you are willing to speak or present a program to a group in your area, please let me know your name, address, telephone numbers and your topic. We expect that in the future most of these groups will be able to at least reimburse travel expenses.

Film service

If you have your own good quality films or you know of available films please let me know the title, from whom it is available, specification (8 or 16 mm, black or white or color, sound, etc.) running time, and rental cost. -- I. Gilboa, HISS.



FIGURE. Dendrobates pumilio, adult male calling while "in hand." [Photo by Franco Peñalba, courtesy of Jaime Villa.]

My thanks to all those who kindly sent me publications and news items. I am sorry that we are not able to include all of them this time. Please keep them coming. - I. Gilboa.

MARYLAND HERPETOLOGICAL SOCIETY

MEETING SCHEDULE: 1972

All meetings and field trips are open to the public, and anyone interested is cordially invited to participate.

Meetings are held at the headquarters of the Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218, beginning at 10:00 AM on the third Saturday of October thru March. Field trips leave from the same address at 8:00 AM on the third Saturday of April thru September. Steering Committee and Business meetings (open to everyone) are held at the same address, beginning at 8:30 PM on the first Wednesday of March, June, September, and December.

19 February....Speaker - Mr. Craig Phillips, Assistant Curator, United States National Aquarium. "Exotic amphibians and lizards introduced into the Miami, Florida, area"

18 March....Speaker - Mr. Christopher H. Dodge, Biologist, U.S. Navy (update on his research into turtles and gravity).

15 April....20 May 1972; 17 June 1972: Field trips to selected areas in Maryland.

15 July....East Coast Herpetological Societies combined meeting in the Baltimore-Washington area; to be sponsored by MHS

19 August....Field trip to selected areas in Maryland

16 September....Field trip to selected areas in Maryland

21 October....Speaker - William Marvel, Art & Culture Columnist, National Observer (gartersnakes as a hobby).

18 November....Speaker - to be announced

16 December....Speaker - F. Prescott Ward, V.M.D., Research Veterinarian, Edgewood Arsenal, Department of the Army (update on research on the amphibians and reptiles of Carroll Island, Maryland).

(Steering Committee and Business meetings will be held 1 March, 7 June, 6 September, and 6 December.)

CTTC - WESTCHESTER

The WESTCHESTER CHAPTER of the CALIFORNIA TURTLE AND TORTOISE CLUB (Alondra Park Headquarters Bldg., 3850 Manhattan Beach Bl., Lawndale, California) is planning to purchase some land on which to set up a (primarily) tortoise preserve. A good-sized sum of money has been earmarked for this project by an interested member. Tentative plans are to have accommodations for someone to be on the property most of the time. Also, planning calls for some area where holding pens can be erected for the purpose of acclimating tortoises gathered up to be set free eventually. More about this as plans develop.

BACK ISSUES

The Southwestern Herpetologists Society publishes a monthly NEWSLETTER, a quarterly magazine, HERPETOLOGY and an annual journal, HERPETON. HERPETOLOGY contains articles pertaining to reptiles and amphibians by members and interested contributors. HERPETON features papers of an original and scientific nature and should be of value to all herpetologists. Both HERPETON and HERPETOLOGY are available for $.50 each. Write for order blank and list to: Herpeton-Herpetology, P.O. Box 2054-D, Pasadena, CA 91105.



D E A L E R S ?

The following dealers in California listed below have been advertising reptiles and herpetological supplies for sale in several leading nationally circulated magazines during the past year. These dealers operate only under postal box numbers, names, or street addresses. They all claim to be members and recommended dealers of the "American National Herpetological Society." The NYHS urges persons who have had contact with the organizations listed below to write their experiences and comments to Dave Hulmes, President, P.O. Box 3946, Grand Central Station, New York, NY 10017.

American National Herpetological Society
West Covina, California 91790
Animal Compound
Industry, California 91744
Biological Scientific Research
City of Industry, California 91744
Bwana Iguana
Palm Springs, California 92262
Cal-Bio-Lab
La Puente, California 91747
California Zoological Research Associates
Los Angeles, California 90032
Circumglobal Scientifics, Inc.
Diamond Bar, California 91766
Desert Reptile Specialties
Whittier, California 90607
Herpetological Service
Fullerton, California 92634
Herpetological Library, Western Division
Valinda, California 91747
Herpetologist
Azusa, California 91702
Herpetologists
Puente, California 91747
National Biological Space Administration
Azuza, California 91702
Mojave Desert Serpentarium
Mojave, California 93501
Reptiles International
West Covina, California 91790
Reptiles
San Gabriel, California 91778
Reptiles
Thousand Oaks, California 91360
Reptiles
West Covina, California 91790
Reptile Sales
Hacienda Heights, California
Research Associates
Los Angeles, California 90032
Rosamond Biological Supply
Rosamond, California 93560
Serpentarium
Long Beach, California 90801
South Hills Serpentarium
Valinda, California 91744
The Reptile Collectors
Long Beach, California 90801
Williams Serpentarium
Puente, California 91747
World Zoological Exchange
Valinda, California 91744

(From NYHS Newsletter, Jan 1971).

WORLD WILDLIFE FUND

The World Wildlife Fund is expending a great deal of money in conservation projects, many of which are of herpetological interest. It seems strange that the herpetological societies have no voice in the projects selected or the monies allocated.

The following selection gives some indication of the projects and funds currently involved (From ANIMALS 13(17): 814-815).

	BUDGETED FUNDS
MARINE TURTLES -- Survey on Southeast African coast	2,566
TORTOISE, Testudo yniphora, Madagascar -- Biological survey to prepare conservation measures	1,306
MORELET'S CROCODILE -- Propagation in captivity in Mexico	2,704
NILE CROCODILE, Ethiopia -- Assessment of resources and management program	1,176
ENDEMIC IGUANA of Anegada, British Virgin Islands -- Contribution to Conservation	4,308
GALAPAGOS ISLANDS, Ecuador -- Educational leaflet	14,436
Evaluation of tourist impact and management	6,874
Tortoise rearing	2,703
Study of effects of introduced mammals	7,796
Control & eradication of introduced mammals	10,770
Maintenance of Charles Darwin Research Station	3,665
SEA TURTLE RESOURCES, Western Australia -- Conservation prog	5,137
HAWKSBILL TURTLE -- Conservation in Queensland	5,137
MADRAS SNAKE PARK, India -- Establishment	2,708
IUCN RED DATA BOOK -- Vol. 3., Amphibia & Reptilia	916
MARINE TURTLES -- Coordination of conservation work	7,379
British Pounds (Almost $200,000 !)	79,581

NATIONAL GEOGRAPHIC SOCIETY

The National Geographic Society recently listed (NGS Research Reports, 1971) some of its research grants for 1969 and 1970. Among them were the following.

WILLIAM G. REEDER (Univ. Wisconsin, Madison) to study the distribution, ecology, and behavior of Galapagos tortoises.

WAYNE F. FRAIR (Kings Coll., Briarcliff Manor, N.Y.) for a taxonomic study of the giant leatherback turtle in Surinam.

THOMAS W. SCHOENER (Harvard Univ.) for a continuing study of the Anolis lizards of the West Indies.

ROGER C. WOOD (MCZ, Harvard Univ.) in aid of research on the systematics, evolution, and ecology of the pleurodiran turtles in South America.

WILLIAM P. HALL (MCZ, Harvard Univ.) in support of a study of the biogeography of karyotype variation in the iguanid lizard Sceloporus grammicus.

THE SOCIETY OF THE SIGMA XI

Sigma Xi makes a number of grants to promising scientists at critical points in their research careers. The following awards were selected from the 1970 and 1971 lists (AMER SCI 59). These are continued from HERPETOL REV 3(6): 116.

James F. Jackson, University of Florida. Perch niche size and variability of locomotor structures in *Anolis* (Iguanidae: Squamata). $200.

Robert O. Kelley, University of New Mexico. Localization of intracellular antigens in presumptive neural ectoderm of the South African frog *Xenopus laevis*. $200.

Chaim N. Kropach, City University of New York. The ecology and population structure of the sea snake *Pelamis platurus* in the Gulf of Panama. $200.

Ronald A. Nussbaum, Oregon State University. Evolution and systematics of the salamander genus *Dicamptodon*. $125.

Stephen R. Parcher, Oildale, California. (1) Search for marked chameleons. (2) Ecology and behavior of *Chamaeleo lateralis*. $300.

Elizabeth K. Perryman, University of Arizona. Electron microscopic study of control of pars intermedia of *Rana pipiens*. $400. RESA Award.

Marilyn L. Riese, Yeshiva University, New York, New York. Spreading depression and length of memory in frogs. $100.

[To be continued.]

CATALOGUE OF

AMERICAN AMPHIBIANS AND REPTILES

The CATALOGUE will have published 125 accounts by the time this issue of HR appears. Those that were included in 1971 subscriptions were:

101. CRYPTOBRANCHUS, C. ALLEGANIENSIS, by Harold A. Dundee.
102. PLETHODON ELONGATUS, by E. D. Brodie & R. M. Storm.
103. PLETHODON STORMI, by E. D. Brodie.
104. LEPTODACTYLUS LABIALIS, by W. R. Heyer.
105. RANA CASCADAE, by R. Altig & P. C. Dumas.
106. CHRYSEMYS PICTA, by C. H. Ernst.
107. DEIROCHELYS, D. RETICULARIA, by G. R. Zug & A. Schwartz.
108. ANOLIS DISTICHUS, by Albert Schwartz.
109. CNEMIDOPHORUS NEOMEXICANUS, by J. W. Wright.
110. OPHISAURUS
111. O. ATTENUATUS,
112. O. CERONI,
113. O. COMPRESSUS,
114. O. INCOMPTUS,
115. O. VENTRALIS, all by J. A. Holman.
116. EURYCEA AQUATICA, by Francis L. Rose.
117. RANA PALUSTRIS, by R. T. Schaaf & P. W. Smith.
118. PSEUDOBRANCHUS, P. STRIATUS, by B. S. Martof.
119. RANA PRETIOSA, by F. B. Turner & P. C. Dumas.
120. GASTROPHRYNE CAROLINENSIS,
121. G. ELEGANS,
122. G. OLIVACEA,
123. G. USTA, all by Craig E. Nelson.
124. CLEMMYS GUTTATA, by Carl H. Ernst.
125. CLEMMYS INSCULPTA, by C. H. Ernst.

We have some additional accounts in hand, and expect to publish another 25 accounts in 1972.

The emphasis to this date has been on species and genera that occur in the United States and Canada. We would like to complete this region before moving too far to the south. However, a number of forms still await authors.

The salamander accounts are the most nearly complete. Almost all of the genera and species have been either published or assigned. The remaining are as follows:

AMPHIUMA
- A. means
- A. tridactylum

Eurycea longicauda

PSEUDOTRITON
- P. montanus
- P. ruber

There are several frog accounts for which authors are still needed. These are:

ACRIS
- A. gryllus

BUFO
- B. americanus
- B. debilis
- B. marinus
- B. microscaphus
- B. punctatus
- B. quercicus
- B. retiformis
- B. speciosus
- B. terrestris

ELEUTHERODACTYLUS

HYLA
- H. arenicolor
- H. cadaverina
- H. chrysoscelis
- H. crucifer
- H. regilla
- H. squirella
- H. versicolor
- H. wrightorum (eximia?)

PSEUDACRIS
- P. brachyphona
- P. clarki
- P. nigrita
- P. ornata
- P. triseriata

RANA
- R. catesbeiana
- R. clamitans
- R. "pipiens"

SCAPHIOPUS
- S. bombifrons
- S. hammondii
- S. intermontanus

About sixty lizard accounts are still unassigned. These are:

ANOLIS
- A. carolinensis

CALLISAURUS
- C. draconoides

CNEMIDOPHORUS
- C. burti
- C. exsanguis
- C. flagellicaudus
- C. gularis
- C. inornatus
- C. scalaris
- C. sonorae
- C. tesselatus
- C. tigris

COPHOSAURUS
- C. texanus

CROTAPHYTUS
- C. collaris

DIPSOSAURUS
- D. dorsalis

EUMECES
- E. callicephalus
- E. obsoletus

GERRHONOTUS
- G. coeruleus
- G. multicarinatus

[TO BE CONTINUED]

Volunteers please write to the appropriate Section Editor, or directly to the CATALOGUE office (see third cover).

AN UNUSUAL ACCIDENT INVOLVING AN EASTERN KING SNAKE, Lampropeltis getulus getulus

John D. Groves and Estella M. Groves

On 2 September 1970 we collected a four foot kingsnake, Lampropeltis getulus getulus, from under a 6-foot square slab of concrete at a destroyed home, approximately 2 miles southeast of Massey, Kent County, Maryland. This snake had a zip-top ring (used on beverage cans) encircling its body about 6 inches from the head. The ring had cut into the snake to a depth of 1/4 inch,



FIGURE. Kingsnake with "zip-top" injury.

exposing parts of the esophagus and vertebrae (Fig. 1). The exposed damaged tissue was gangrenous.

The snake was taken to the Baltimore Zoo, where the ring and gangrenous tissue were removed. Nitrofurazone Ointment N.F. (Nitrofurazone 0.2% in a water soluble base of Polyethylene Glycols) was applied daily to prevent further bacterial infection. On 5 September the snake was sent to Dr. Mitchell Bush, Veterinarian and Assistant Professor of the Division of Laboratory Animal Medicine at Johns Hopkins University, School of Medicine, who sewed the wound with nylon sutures and removed the excessive hanging tissue and skin. The snake was then returned to the Baltimore Zoo, where daily application of Nitrofurazone was continued.

Recovery was quick and complete. The king snake was offered several juvenile Elaphe obsoleta on 9 September which were ingested immediately. Since 18 September 1970 this snake has eaten one to three mice per week. Shedding occurred weekly for a period of three months after the ring was removed. After this period shedding occurred on the average of twice each month.

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REPORTS

The reports section of H R will publish notes of interest to herpetologists which ordinarily would not appear in scientific journals. These include information on specific items of morphology or physiology (e.g., karyotypes, temperature records), new geographic records or corrections, field-trip and life history records (e.g., seasonal appearance), and comments or corrections on previous papers published here or elsewhere. HERPETOLOGICAL REVIEW is not intended as an alternative to the ordinary publication of the results of scientific studies in established journals.

LOST MEMBERS

Publications of the SSAR or H L have been returned from the following individuals marked "Not Known" or "No Forwarding Address." We would appreciate any aid in obtaining current addresses.

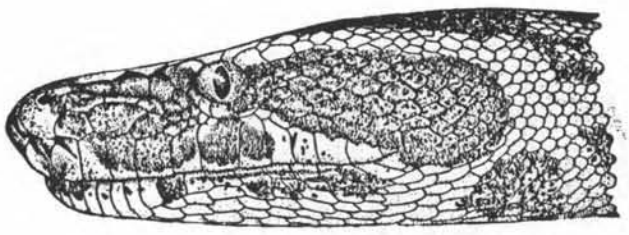
EDD C. BAKER, Ft. Myers, FL 33901.
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CORBETT B. COBURN, JR., Macon, GA 31201.
ANDY COLLINS, Lexington, MA 02173.
GEORGIA M. GIBERSON, Long Beach, CA 90812.
MICHAEL KRULIK, Melrose Park, IL 60164.
JOSEPH R. LANNOM, JR., Mercury, NV 89106.
CHARLES F. MACGOWAN, Oakland, CA 94619.
DAVID J. MILLER, San Francisco, CA 96343.
JOHN MURPHY, Carbondale, IL 62901.

HERPETOLOGICAL HUSBANDRY

As indicated in the Editorial, we expect to initiate a regular column, edited by James Murphy of the Dallas Zoo, with the next issue.

Meanwhile, we are reprinting two articles on reptile care that were kindly sent to us by D. K. Blake, of the Rhodesian Department of National Parks and Wildlife Management. These are issued as mimeographed sheets as guidelines for reptile exhibitors.

These two articles should not be considered as our recommendations for care, but are presented for their interesting ideas and as an aid in establishing a format for this new section. -- HGD.



[From Witte, 1962.]

CAGE OR HOUSING MINIMUM SPECIFICATIONS FOR PYTHON: Python sebae (Gmelin)

Size

No cage for the confinement or housing of any python shall be less than 12 feet long, 6 feet wide and 6 feet high, providing that no python exceeding 11'6" total length shall be confined or housed therein. For the housing or confinement of any python exceeding 11'6" special application shall be made to the Department of National Parks and Wildlife Management for housing specifications.

At one end of the cage shall be a water trough which shall be finished to a smooth steel-floated cement surface. The trough, which shall extend over the width or depth of the cage, i.e. from front to back thereof, shall be two feet wide and shall be not less than one foot in depth. The trough is, with the exception of the upper three inches, to be below the floor level of the cage and the floor of the trough shall be sloped toward the rear of the cage so as to facilitate drainage and shall be fitted with a drain plug enabling the trough to be fully drained, the outflow of which shall be outside the cage. The filling pipe is to be situated at the front of the trough but shall be controlled from the rear of the cage.

Materials and Construction

The cage to be built of brick or concrete and all internal walls to be smooth plastered with all internal corners and wall junctions rounded.

Viewing windows are to be fitted to the front of the cage only and shall be of plate glass puttied into a concrete or steel frame. NO WOOD IS TO BE USED. The use of "one way" glass is strongly recommended.

Access to the interior of the cage shall be from the rear only, and the door and frame shall be of metal construction and of the sliding type so constructed as to provide easy access to the interior of the cage for cleaning purposes.

All ventilation shall be at the rear of the cage, shall be of the standard airbrick wall type placed just below the ceiling of the cage and in number shall be not less than one for every two feet of cage length.

The cage shall be fitted with a ceiling of flat asbestos sheeting and there shall be an air space of not less than one foot between this ceiling and the roof over the cage, this gap to be closed at front and sides but left open at the rear. The roof shall be large enough so as to preclude all but early morning and late afternoon direct sunlight from striking the cage on any side.

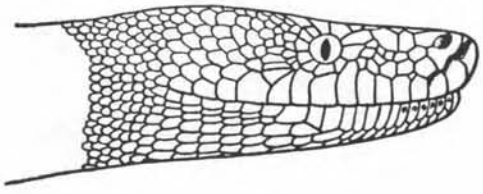
A heating system shall be built into the floor or ceiling of the cage preferably of the thermostatically controlled convection type, so set as to maintain a constant interior ambient temperature within the cage of not less than 50 degrees F. Open bar heaters will not be permitted.

Floor Covering and Contents of Cage

Floor covering to be either coarse washed sand or small pebbles. A bed of clean straw is to be provided at the end of the cage opposite to the water trough. A large dead tree branch is to be placed in the cage upon which the reptile can climb and one or two large rocks should also be provided - these will provide a rough surface to assist the snake when skin sloughing takes place.



General distribution of Python sebae.



[From FitzSimons, 1962.]

Maintenance

Water trough to be drained, flushed and re-filled daily.

Cage to be checked at least once daily for faeces, shed skin, etc. and these are to be removed immediately together with any contaminated floor or bedding material.

All pythons in the cage shall be checked regularly for disease or damage.

The cage to be checked regularly for the presence of mites, if these are found the entire cage shall be cleaned out and fresh straw and dead tree branch provided. All old straw and tree branch to be immediately burnt.

Feeding

Live prey must not be left in the cage for periods longer than 24 hours and a food supply for such prey must be provided within the cage. Live prey should not be left in the cage during public viewing periods.

Dead prey may be left in the cage for periods not exceeding 12 hours provided that the condition of such prey was fresh when initially placed in the cage.

A written record of the feeding of pythons together with details of food taken, is to be kept. If it is found that any python has not fed over a continuous period of 90 days, this shall be reported immediately to the Department of National Parks and Wild Life Management and arrangements will be made for the release of the reptile.

Numbers

No more than three pythons shall be held at any one time in a cage constructed to the foregoing specification. All hatchlings or deaths shall be immediately reported to the Department in writing. No python may be sold, bartered, exchanged or released without the authority of the Director of National Parks and Wild Life Management.

Handling of python should be kept to a minimum and confined to that necessary for cage cleaning and the treatment of any injury or disease. No handling for display purposes is to be permitted.

The public are to be excluded from the rear of the cage at all times.

Appendix "B"

The following notice shall be prominently displayed in front of the cage where it is clearly visible:

PERMIT TO HOLD ROYAL GAME

Python are classified as Royal Game in terms of the Wild Life Conservation Act, 1960. These pythons are held in terms of Permit No. - - - - - - - - - - issued by the Department of National Parks and Wild Life Management.

Python are afforded the protection of Royal Game status because (a) they play an important part in the control of rodents; (b) are non-venomous and (c) could be in danger of mass slaughter for commercial gain leading to possible extinction of the species.

Department of National Parks and
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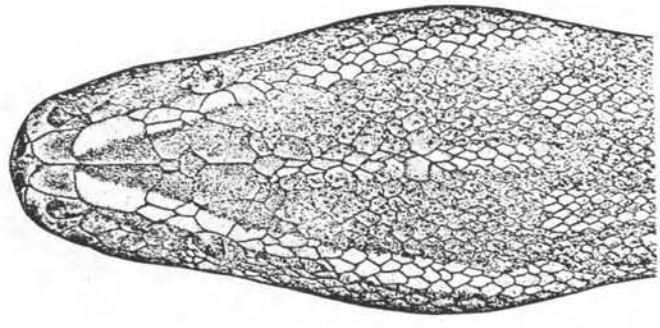
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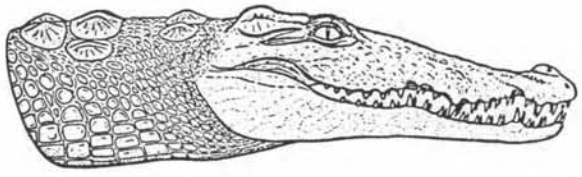
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[From Witte, 1962.]



[From Wermuth, 1953.]

CONDITIONS FOR KEEPING CROCODILES

General

These conditions will apply to all crocodiles held in captivity, with the exception of crocodiles being reared for skin production or to crocodiles being held for scientific research. They will be applicable to crocodiles held by crocodile farms for display purposes.

Numbers and Size

The number of crocodiles which may be held in a pen at any one time will depend on their length. The categories given below show the number of crocodiles that may be held in each size group.

CATEGORY	SIZE	NUMBER
"A"	Under one metre in length	16
"B"	From one metre but under two metres	8
"C"	From two metres but under three metres	4
"D"	Three metres and over	2

Notwithstanding the abovementioned categories no crocodiles under three metres in length will be held in the same pen if the difference in length between such crocodiles is more than half a metre.

Pens

The pen may be constructed in any shape but will not be less than 100 square metres in area and no two sides may be less than four metres apart.

The walls of the pen will be constructed of brick or other suitable material and shall not be less than one metre in height, and the inner face will be smooth plastered. Where such pen is for public display, any wall accessible to the public will be topped by a fence of not less than 60 cms in height, having parallel strands not more than 10 cms apart and down strands or droppers not more than 50 cms apart.

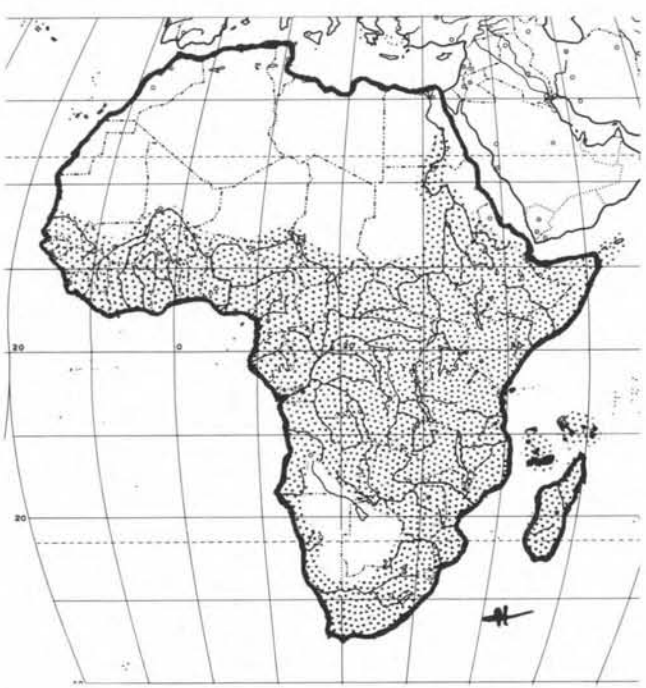
Any door set into the wall will be solid and have no apertures therein. It will be fitted so as to open into the pen and will be fitted with an automatic closing device as well as having a suitable lock or padlock fitting. Any door or gate set on top of the wall in the fence will similarly be fitted with an automatic closing device and suitable lock or padlock fitting. Any steps leading up to the door or gate will be moveable and will be removed when not in use.

The pen will contain shelters or bushes large enough to provide shade for the crocodiles housed therein. It will also have cleared areas large enough for the crocodiles to be able to sun themselves. The area of the pen not taken up by the pond will be of earth or sand.

Ponds

The pen will contain a pond so constructed that the water surface is not less than five metres long and two metres in width. Water depth over 50% of the length of such pond shall not be less than one metre in depth.

The pond may be constructed of either concrete or earth but in both cases will be fitted with a drain and overflow drain. In either case the sides of the pond will slope so as to allow the crocodiles easy access to and from the pond.



General distribution of Crocodylus niloticus.

A concrete feeding dais will be constructed at one side of the pond with a channel from the pond leading around it. This dais will be constructed of concrete notwithstanding whether the pond is of concrete or earth construction.

Retreats

In pens containing concrete ponds or ponds into which the crocodiles cannot burrow into the walls, special retreats will be constructed.

The retreat will be dug into the floor of the pen in the area where flooding is unlikely and shall be covered with roofing over which at least 20 cms of sand or soil have been placed. The retreat will be large enough to contain all the crocodiles held in the pen and shall be large enough for the largest crocodile to turn around in.

Cleaning

The pen shall be cleaned daily of any faeces, dead meat etc. Where the pond is not adequately stocked with fish to keep it clean it will be drained weekly and cleaned out.

Handling

No handling of the crocodiles will be allowed for public display. Nor will the crocodiles be prodded or goaded into displaying or reacting for the public in any manner whatsoever. All handling will be restricted as much as possible and should be confined to that necessary for cleaning, reconstruction and the treatment of injury and disease.

Feeding

With the exception of fish, no live prey will be introduced into the pen. Feeding will be allowed during public visits but such feeding will not be done by the public.

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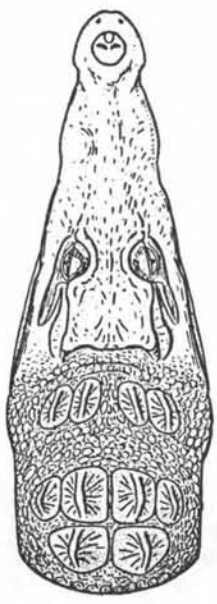
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[From Wermuth, 1953.]

CAPE RESERVE FOR ONE OF WORLD'S RAREST TORTOISES

BY
R. RAU

The geometric tortoise, - listed as one of the most endangered tortoise species in the world - is to be protected in a special reserve in the Cape.

Among the many forms of African land tortoises the geometric group of southern Africa, is named because of the characteristic light and dark radiating colour pattern of the horny shields which cover the bony shell. Since there is a great deal of individual and local variation in shape, colour and pattern to be found in this group of tortoises, it is not surprising that various authors have recognised numerous species of geometric tortoises. However, in the latest revision of African tortoises (Loveridge and Williams 1957) many of them have been synonymised and at present only three species are recognised: *Testudo (Psammobates) geometrica, Testudo (Psammobates) oculifiera* and *Testudo (Psammobates) tentoria.*

Tentoria shows the greatest variation and has the largest area of distribution. *T. geometrica* is the rarest.

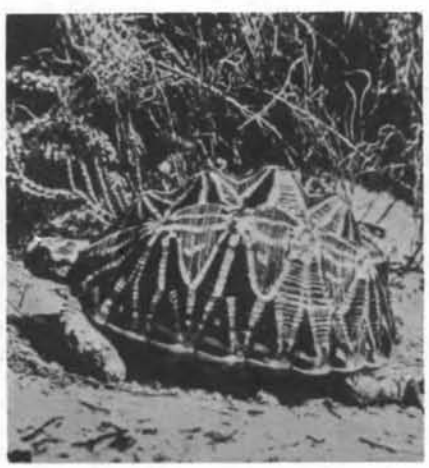
It was generally feared that this species, which was last reported on European pet markets before the first World War (Mertens 1962), had become extinct (Loveridge and Williams 1957). However "rediscovery" of *T. geometrica was* reported by Eglis (1965). It, together with the radiate tortoise of Madagascar, *T. radiata,* is recorded in the Red Data Book of the International Union for conservation of nature and Natural Resources (IUCN) in Switzerland, as the rarest and most endangered tortoise species on earth.

The East London Museum is, to my knowledge, the only institution which, in 1946 and 1947, obtained specimens of this species during the long period of uncertainty, from about 1910 to 1965 The South African Museum in Cape Town received one specimen in August, 1958, but this was only identified as *T. geometrica* in 1965.

Locality records for the geometric tortoise indicate that its distribution area was comparatively small and extended about 100 miles to the north and east of Cape Town, almost following the contour of the Rhenosterbushveld. The species exists in small numbers usually on small, isolated patches of uncultivated land.

While man was thought to be directly responsible for the rapid reduction in numbers of *T. geometrica* (utensil use by native tribes, local consumption as a delicacy and export to overseas pet markets), a different casual effect is involved. This animal, unlike other western Cape tortoises has become dependent on sour soil and its peculiar vegetation, typical of the area. Modern agricultural methods have made it possible to convert this useless veld into fertile farmland, thereby destroying the last remaining habitats of the geometric tortoise at an increasing rate each year.

The usually vast cultivated areas separating the island-like remnants of this habitat appear to be a barrier against migration from one patch to another. In addition to this, interbreeding may have an adverse effect on the population of such an "island". It should be noted, that hatchlings and juveniles are apparently absent from such islands, although their very effective camouflage makes it difficult to distinguish specimens from the criss-cross effect of light and shadow amongst bushes and especially sedges.



Female geometric tortoise, *Testudo (Psammobates) geometrica.* Carapace length 12,8 cm; carapace width 9,5 cm; shell height 7,8 cm.

Since man's agricultural activity has caused the rapid decline of this species, it has become man's moral duty to do everything possible to save this South African form of wild life from extinction. The need of protection was brought to the notice of the Department of Nature Conservation of the Cape some years ago and has recently been endorsed by IUCN and herpetologists.

A reserve of approximately six morgen of original suurveld (a locality which at present possesses the densest population of the geometric tortoise) has been approved by the Provincial Administration of the Cape. It is hoped that the fencing, for which suggestions have been submitted, will be started in the near future.

Although a somewhat bigger reserve would be desirable, the establishment of the proposed six morgen reserve, together with introduction of endangered specimens from a 20 mile radius of the reserve, should prove an important step in securing the future existence of an almost lost member of the world's reptile fauna.

The Department of Nature Conservation has recently included *T. geometrica* in a mammal survey questionnaire, which was sent to 22 000 farmers in the Cape Province. While many answers probably refer to other species, the positive replies from the former distribution area require further investigation.

As apparently in the case of the quagga, *Equus quagga quagga* Gmelin, which was exterminated during the second half of the last century, the possible extinction of the geometric tortoise must not go unnoticed because of a confusion in common names. *T. geometrica* is commonly called the suurpootjie (sometimes seerpoitjie and sierpoetjie) Suurpootjie has also been applied to the tent tortoise, *T. tentoria* and even the padloper, *Homopus aereolatus.*

Many questions concerning the distribution and ecology of this species could be efficiently answered, if funds were made available for full-time study.

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[Reprinted from AFRICAN WILDLIFE 25(3), 1971.]

SANTA CRUZ LONG-TOED SALAMANDER: SURVIVAL IN DOUBT

In recent years, the number of vertebrates threatened with extinction has markedly increased. Many of our North American amphibians and reptiles are declining in numbers as roads, suburbs, and industry engulf their habitats, and as man continues to poison, kill or collect these animals. One of the amphibians most seriously threatened with immediate extinction in North America is the Santa Cruz long-toed salamander, Ambystoma macrodactylum croceum. We describe here its present status.

A. m. croceum is listed in the U.S. Red Data Book and the I.U.C.N. Red Book as endangered. According to the U.S. Species Conservation Act of 1969 it may not be transported across state lines. The State of California has deemed it as both a fully protected and endangered vertebrate, whereby it is illegal to take, possess, harm, or sell Santa Cruz long-toed salamanders. Any person who violates the provisions of the California regulations may be subject to a maximum fine of $1,000 or imprisonment up to one year, or both. Clearly, we recognize A. m. croceum as an animal on the brink of extinction and have provided it with legal protection. However, populations are being eliminated because its limited habitat is being destroyed. There are only two known breeding populations of A. m. croceum. Both occur in temporary ponds and marshes in coastal Santa Cruz County, California. One site has already been altered by man, and the other is now threatened with obliteration.

Valencia Lagoon near Aptos is one site. It once was a large pond and marshy area, nestled between rolling, wooded hills. On January 12, 1970, road crews completed widening two lanes of Calif. Hwy. 1 which bordered the north end of the marsh. They constructed a new freeway and built a 75 foot wide storm channel south of the road. The drainage channel was designed to handle runoff from a "once in 100 years" type flood. This wiped out a good share of the marshy area, and drained all standing water. The freeway construction was nearly finished before the California Division of Highways learned they had destroyed the habitat for an endangered species. Conservationists bemoaned the devastation to this truly scenic spot. Dr. Robert C. Stebbins (pers. comm.) aptly said that the State Highway Division has until recently been largely unaware of the biological implications of their construction schemes. Further, he said that the fact that the disaster has befallen an obscure, little-known animal enhances the point that a creature need not be a whooping crane or as big as a redwood tree to warrant our concern.

Unlike past incidents, however, the Division of Highways desired to rectify the detrimental effects of the freeway construction. In February, 1970, Dr. Stebbins met at Valencia Lagoon with representatives of the Highway Division, U.S. Fish and Wildlife Service, California Fish and Game, and several private citizens, to determine what measures could be taken to restore the damaged site. Shortly thereafter, a blue print was drawn up for a 'salamander pond', the first such plan for a highway department, and construction was done during the summer of 1970. The new pond is 250 feet long by 50 feet wide, and 3 feet deep in the middle. Spike rushes (Heleocharis sp.), cattails (Typha sp.) and knotweed (Polygonum sp.) were planted along the edges of the water. The pond was open for salamanders in late 1970.

Despite the well-meaning measures taken by the Highway Division, there remains a serious threat to the survival of the Valencia Lagoon population. Construction of the storm channel left little surface cover, and kikyu grass (Pennisetum clandestinum) was planted to control erosion. It may be several years before the new pond returns to a heavily vegetated condition of native plants. Wooded slopes southwest of the pond serve as a summer refuge for the salamanders. Several houses and a dirt road are located here, and further development in the woods could destroy ground cover

essential to the survival of the adults.

The adults could not breed during the winter or spring of 1970 due to the lack of standing water. In April, 1971, one of us (Bury) checked the man-made pond and no salamanders or larvae were observed. Adults are presumed to be long lived and, perhaps, they will eventually return to the man-made pond. However, at this time we have no assurance the salamanders will continue as a viable population at Valencia Lagoon.

The second locality is 1/2 mile NW of Ellicott Railroad Station (4 miles west of Watsonville). The salamanders breed in an oval temporary pond which fills with water during winter and spring rains. The pond is variable in area, but is usually about 150 feet long and 120 feet wide at its greatest extent. Spike rush is a dominant plant but knotweed is also common. A dense thicket of willows (Salix sp.) and blackberry vines (Rubus sp.) cover an area about 840 square yards in size on the southeast side. Oak woodland occurs about 1/8 mile northeast of the pond. The area is now a cow pasture. A trailer park borders the site to the south, and roads or country homes surround the other sides. There are plans to build a trailer court for mobile homes at the Ellicott locality. Construction is imminent, and may start in early 1972. A special permit from the county Board of Supervisors was obtained to build the trailer park in this residential zone (country style homes). The trailer court, however, was recently denied a renewal of the building permit. At this time, they are trying to secure the permit and, apparently, will demand a sizable settlement from Santa Cruz County if they do not receive authorization to build at the Ellicott site. Most importantly, there is a temporary delay in the proposed destruction of the salamander pond. We recently brought the plight of the salamander to the attention of the Nature Conservancy and the Sierra Club, as well as state and federal agencies. Their responses and actions in the next few months may decide the fate of the Santa Cruz long-toed salamander.

The pond and willow thicket at the Ellicott site need to be acquired in order to save the habitat for the salamander population. However, this will be extremely difficult since the assessed land value is $5,000 per acre and, presumably, a 34 acre parcel must be purchased in one transaction. Further, the oak woodland habitat northeast of the pond is thought to be important refuge for transformed animals, and in the future this area could be razed for home construction.

If the Ellicott site can not be protected, adults and larvae could be transplanted to other ponds in the region in hopes of establishing a breeding population. However, moving salamanders to alternate sites is undesirable since there is no guarantee the transplantation will be successful.

There have been rumors of another locality with A. m. croceum in the Watsonville area, but we have no verification of this population. The entire region is being rapidly urbanized and suitable sites for the salamander are disappearing at a fast pace. A thorough search for the salamander is desperately needed in hopes of finding new populations and locating possible sites for transfer of some of the Ellicott salamanders if that site is to be destroyed. However, several workers have explored the Watsonville-Santa Cruz region in the past without uncovering the salamander, and the chances of finding new populations seem remote.

Continued surveillance of the Valencia Lagoon population is needed and, hopefully, the adults will return to breed in the man-made pond. The battle to save the Ellicott Station locality is starting. Without immediate action to save these areas, the continued survival of the Santa Cruz long-toed salamander is indeed questionable.

Acknowledgements. We thank Dr. Robert C. Stebbins for his review of this paper, and for his permission to use his files and information on the salamander.

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ADDENDUM

On November 30, 1971, the Santa Cruz County Board of Supervisors voted 5 to 0 to deny rezoning of the Ellicott site from its present agricultural use to that of a proposed mobile home park.

A short-lived but intense campaign by a coalition of conservation groups and governmental agencies helped obtain the ruling. Testimony against rezoning was presented by representatives of the Sierra

The Salamander Wins Out over A Trailer Park

SANTA CRUZ, Calif. (AP) — Students, ecologists, and government officials have rallied to save the last breeding pond of the rare Santa Cruz long-toed salamander.

An overflow crowd of 120 persons heard the county Board of Supervisors vote 5 to 0 against a rezoning that would have allowed a developer to drain the pond eight miles south of here for a mobile home park.

Speakers argued that the proposed development would doom the rare amphibian, an eight-in-long, lizard-like creature, to extinction. Environmentalists presented petitions they said bore 850 signatures opposing the rezoning.

Stephen B. Ruth, a University of California at Berkeley zoology researcher, said the salamander has for 10,000 years laid eggs only at two small ponds near Santa Cruz, and one was drained in 1969 for a freeway extension.

Club, Nature Conservancy, Herpetologists' League, members of the Conservation Committee (Amer. Soc. Ichthyol. Herpetol.), California Office of the Attorney General, California Department of Fish and Game, U.S. Bureau of Sport Fisheries and Wildlife, Museum of Vertebrate Zoology, Cabrillo College, local youth groups, and free-lance conservationists. A deluge of mail expressing concern about the salamander was received by the Board of Supervisors, including a letter from the Assistant Secretary of the Interior.

Efforts are being made to protect the salamander habitat. Grazing of livestock previously denuded almost all vegetation at the site; these animals have been removed. Further, cover will be moved into the area to provide refuge for adult and transforming salamanders. A nearby well will be used to provide water for the pond since it has not filled sufficiently in recent years. Students at the Museum of Vertebrate Zoology are determining the extent of the terrestrial habitat used by adults.

However, the battle is not won. Negotiations are underway to purchase the land from the owners. Money is urgently needed to buy the pond and willow grove at Ellicott. Assistance in this project is being offered by several groups. The Santa Cruz County Board of Supervisors requested that the Secretary of the Interior take immediate steps to commit funds for acquisition of the property for a wildlife preserve. California Fish and Game is recommending to the State Assembly that funds be allotted for the purchase of part of the lands at Ellicott and for restoration of the habitat at Valencia Lagoon. The Santa Cruz County chapter of the Sierra Club will aid in a fund raising campaign to help in the land purchase. It will undoubtedly take a combined effort by these organizations and other groups to acquire a substantial area for the salamanders.

Letters of support and money are needed if this endangered salamander and its associated biota are to survive. Two options are available for contributions:

NATURE CONSERVANCY c/o SALAMANDER FUND, 215 Market Street, San Francisco, California 94105. This organization is non-profit and tax exempt; contributions are tax deductible. Their efforts have saved many natural areas in the past. However, it must be clearly known that if negotiations between the Nature Conservancy and the land owners should fall through then contributions to the salamander fund will be used for other projects.

SAVE THE SALAMANDER, Acct. No. 053 301 8511, Wells Fargo Bank. This is a separate fund established exclusively for the salamander. It was formed by conservationists in the Santa Cruz area in order to raise money locally, but will gladly serve as a depository for contributions from other areas. They have applied for incorporation as a non-profit organization, and tax exempt status is pending approval. Checks to this fund can be sent to any branch of the Wells Fargo Bank; be sure to show the account number. Or, checks can be sent to Wells Fargo Bank, Capitola, California 95010.

Also, letters to governmental agencies are needed. We urge you to express your opinions and interest to Roger C. B. Morton, Secretary, U. S. Department of the Interior, and Senator Alan Cranston, Senate Office Building, Washington, D.C. 20510, and to G. Ray Arnett, Director, Calif. Dept. Fish and Game, 1416 Ninth St., Sacramento, Calif. 95814.

R. BRUCE BURY &
STEPHEN B. RUTH

Museum of Vertebrate Zoology
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Ambystoma macrodactylum (not croceum)

[From Stebbins, 1951.]

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HERPETOLOGICAL REVIEW will publish brief notices of new geographic records, in order to make these available to workers in published form. The STANDARD FORMAT for these records is:

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NEW RECORDS

AMBYSTOMA TREMBLAYI. U.S.A., Wisconsin, Price Co., 13.5 miles ENE of Philips at abandoned CCC camp site on Elk River (T38N, R3E NE 1/4 Sec. 30); 30 April 1971; J. L. Briggs, G. Nelson. Personal collection #449, Milwaukee Public Museum #MPM-3468. Second record for the state of Wisconsin 72 miles southeast of the earlier Washburn record. No erythrocytes were examined before death of this female. Total length is 140 mm; Snout-vent is 70 mm, internarial distance is 4.7 mm. Submitted by J. L. BRIGGS, Department of Biology, University of Wisconsin-Whitewater, Whitewater, WI 53190.

CLEMMYS MUHLENBERGI. U.S.A., Pennsylvania, Northampton, Cherryville; 22 August 1935; Mary Kapenhaver. H. A. Dundee. Tulane University #158. First record for county. Submitted by J. L. BEHLER, Department of Herpetology, New York Zoological Park, Bronx, NY 10460.

HEMIDACTYLUS GARNOTII. U.S.A., Florida, Lee Co., Sanibel Island; 8 Dec. 1971; M. Graham Netting. C. J. McCoy. Carnegie Museum 55585 (3 specimens). First record for west coast of Florida, other localities in south Miami and Everglades National Park (King and Krakauer, 1966, Quart. J. Fla. Acad. Sci. 29(2): 145; Kluge and Eckardt, 1969, Copeia (4): 659). Submitted by C. J. McCOY, Carnegie Museum, Pittsburgh, PA 15213.

CORRECTION OF DISTRIBUTIONAL RECORDS FOR *GRAPTEMYS BARBOURI* AND *GRAPTEMYS PULCHRA*

James L. Dobie

Graptemys barbouri is apparently endemic to the Apalachicola River System. The sole indication to the contrary is a specimen at Tulane University (TU 13471) reportedly collected in the Escambia River (Cagle, 1952), whose outflow is approximately 150 miles west-northwest of that of the Apalachicola River. It is doubtful that this specimen bears the correct locality datum. Extensive collecting in the Escambia River System by Robert Mount of Auburn University and his field crews has yielded no *G. barbouri*. Neither have there been any *G. barbouri* collected in the Choctawhatchee River System or the Yellow River, both of which are east of the Escambia River System. *Graptemys pulchra*, however, is common in the Escambia River and also occurs in the Yellow River. Apparently, there are no *Graptemys* in the Choctawhatchee River System.

The original entry for TU 13471 in the Tulane University catalog, according to curator, Harold Dundee, was "*G. pulchra*," but someone marked through this and entered "*G. barbouri*." Specimen numbers TU 13464-89 were not entered in Cagle's field book. Presumably the animals were not catalogued in the field; TU 13463 was the last field book entry and was listed as *G. pulchra* from the Escambia River. Moreover, TU 15222.5, one of a series of skulls (TU 15222.1-15222.12) obtained from specimens reportedly collected in the Chipola River, is *G. pulchra*. The remainder are *G. barbouri*. *Graptemys pulchra* has not been reported from the Apalachicola River System and apparently does not occur there. It is logical to suspect that specimen TU 15222.5 is actually the one to which the Escambia River datum in question applies, and that TU 13471 belongs with the Chipola River series of *G. barbouri*. The Chipola series was collected on 12-14 July, 1950 and the Escambia series on 15-16 July, 1950; thus, an accidental exchange of the two specimens in question could have occurred easily.

Drs. George H. Blake, Jr., M. Keith Causey and Costas A. Kouskolekas kindly reviewed this manuscript. I thank Dr. Harold Dundee for the loan of specimens and for graciously checking on entries in the Tulane Catalog and in Cagle's field book.

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CAGLE, F.R. 1952. The status of turtles *Graptemys pulchra* Baur and *Graptemys barbouri* Carr and Marchand, with notes on their natural history. COPEIA 1952(4): 223-234.

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DECEMBER 1971

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DECEMBER 1971

ARTICLES

103 THE PHILADELPHIA MEETING. The second co-sponsored meeting of the Herpetologists' League and the Society for the Study of Amphibians and Reptiles will be held 28-30 December 1971.

105 Abstracts of the meeting.

UNREVIEWED - UNEDITED

109 A POSSIBLE CASE OF MIMICRY IN FROGS, by Craig E. Nelson and Gene A. Miller.

110 THE HEMIPENIS OF THE ONION-TAIL GECKO, THECADACTYLUS RAPICAUDUS (HOUTTUYN), by H. G. Dowling, T. C. Majupuria, and F. W. Gibson.

111 NOTEWORTHY HERPETOLOGICAL RECORDS FROM HONDURAS, by Donald E. Hahn.

DEPARTMENTS

102 LETTERS TO THE EDITOR
Harvey and Margaret Pough on "Cold Snakes."

T-91 CURRENT HERPETOLOGICAL TITLES, XVIII.

T-102 HERPETOLOGISTS RECORD
Cole and Leavens on an improved chromosome technique.

113 BOOK REVIEWS
Minton on Neill's "Ruling Reptiles."

Collins on Barbour's herpetology of Kentucky.

NEWS AND ANNOUNCEMENTS
112 Kansas looks for a herpetologist.
115 Herpetology at Notre Dame.
116 CALENDAR
Individuals and Institutions.

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LETTERS TO THE EDITOR

HOW COLD ARE COLD SNAKES? COMMENTS ON THE RELIABILITY OF LOW TEMPERATURE RECORDS

F.Harvey Pough & Margaret B.Pough

Hundreds of herpetologists have recorded activity temperatures of reptiles and the criteria for significant measurements have been discussed at some length (Cowles and Bogert 1944, Heath 1964). Encounters with reptiles in unusually cold situations are chance events and there are far fewer measurements at the low end of the temperature range. Unfortunately, most existing measurements are of doubtful value because rigorous standards have not been applied to them.

Parks (1969) reported an instance of a bull snake (Pituophis catenifer) active at "near-freezing" temperatures. The snake in question was crawling along a road. The snake's body temperature was not measured, but was assumed to be low because the air temperature 1 inch above the road was 4 degrees C. We doubt that this line of reasoning is reliable as a general rule. The following example illustrates our point.

At 1600 hr on 27 February 1971 we found a garter snake (Thamnophis s. sirtalis) resting on a snowbank in a field of nearly unbroken crusted snow. The snake (an adult female, snout-vent length 59.5 cm, weight 107 gm) was about 1 m from a flat rock 20 cm in diameter. It was crawling uphill toward a loose rock wall surrounding a spring. The flat rock and rocks around the spring were the only snow-free areas within a radius of 50 m. The snake was capable of slow coordinated movements and flicked its tongue repeatedly. When approached it inflated its lungs but did not hiss, coil, or strike. The following temperatures were measured at the site of capture: snake cloacal temperature 4.0, snow surface 1.0, air 2 cm above the snow 1.0, surface of flat rock 5.0, black bulb thermometer on rock 9.0, air 1 m above the ground 13.5 degrees C. In an area clear of snow 50 m from the site of capture the temperature of grassy soil in the sun was 6.0 and bare soil was 7.0 degrees C.

We suspect that the snake had been sunning itself on the flat rock and in this position it had probably been able to attain a body temperature close to the 9 degree reading of the black bulb thermometer. The snake's body temperature is probably not particularly significant; if we had found it a few minutes earlier it would have been warmer, a few minutes later it would have been colder.

Air temperatures 30 cm inside the rock wall surrounding the spring (from which the snake had almost certainly emerged) ranged from 1.2 in wet areas to 4.6 degrees C in dry spots. These temperatures were probably relatively stable throughout the day and suggest that the snake had initiated activity at a body temperature in this range. Not knowing when or why the snake emerged it is impossible to say what outside temperature might have attracted it. If it had emerged earlier in the afternoon when the solar flux was greater it could probably have attained a higher body temperature by basking than the 9 degrees measured at 1600 hr. Honeybees had been flying in midafternoon, but by 1600 hr they were beginning to drop to the ground, apparently too chilled to fly.

We think that the difficulty of interpreting the significance of even these unusually detailed temperature measurements illustrates the caution that must be applied to observations of reptiles in cold situations. The problem has two facets: In the first place reptiles have remarkable ability to raise body temperature above ambient by absorbing solar energy. Pearson's (1954) report that Liolaemus in the Andes Mountains may have body temperatures 30 degrees C above air temperatures is a striking example. In the case cited here the garter snake's body temperature was well above the level that could be estimated from the substrate and air temperatures. Measurements of body temperature are thus absolutely essential in such reports. Secondly, even when the snake's body temperature is measured there is no assurance that the measurement has any ecological significance. All we can say from our measurement is that at a temperature of 4 degrees a garter snake is capable of coordinated activity. Interesting, perhaps, but we could have discovered the same thing more easily by putting a snake in a refrigerator. Ideally one would like continuous observation of the snake's activities with a simultaneous temperature record. This is unattainable in most cases. When only isolated temperature measurements are possible, we suggest that there are three points at which the snake's temperature is ecologically significant: when it initiates activity, the highest temperature it can attain by basking, and when it begins to retreat. Isolated temperatures recorded at other stages are of very little value.

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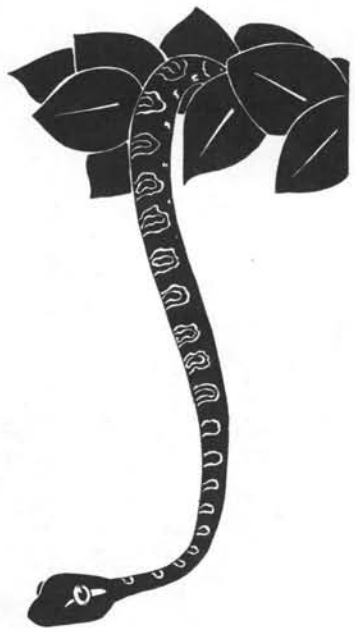
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THE PHILADELPHIA MEETING

of the HERPETOLOGISTS' LEAGUE

and the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

28 - 30 DECEMBER 1971

10:00 AM TUESDAY, DECEMBER 28, 1971

MEETING WITH THE EAST COAST HERPETOLOGICAL SOCIETIES AT THE REPTILE HOUSE OF THE PHILADELPHIA ZOO (34th St. & Girard Ave.)

CONTRIBUTED PAPERS

Arranged by T. Paul Maslin
Curator of the Zoological Collections
University of Colorado Museum
Boulder, CO 80302

TUESDAY, DECEMBER 28, 1971 Benjamin Franklin Hotel, Valley Forge Room

1:30 PM Chairman: MALVIN L. SKAROFF, President Philadelphia Herpetological Society.

Display-action-patterns in the Iguanid Genus Sceloporus. CHARLES C. CARPENTER (Department of Zoology, University of Oklahoma, Norman, OK 73069).

Orientation of the Spadefoot Toad, Scaphiopus bombifrons. HOBART F. LANDRETH and MIKE T. CHRISTENSEN (Department of Zoology, University of Oklahoma, Norman, OK 73069).

Social Behavior of Some Australian Geckos. BAYARD H. BRATTSTROM (Department of Biology, California State College, Fullerton, CA 92631).

Ecotypic Selection in Southeastern Salamanders. GEORGE W. FOLKERTS (Department of Zoology-Entomology, Auburn University, Auburn, AL 36830).

Sound Production and Hearing in the Rattlesnake. JOSEPH M. PYLKA, JAMES A. SIMMONS and GLEN E. WEVER (Auditory Research Laboratories, Princeton University, Princeton, NJ 08540).

Polarized Light: Detection Via Extraoptic Receptor and Its Use By Orienting Salamanders. KRAIG ADLER and DOUGLAS H. TAYLOR (Department of Biology, University of Notre Dame, Notre Dame, IN 46556).

WEDNESDAY, DECEMBER 29, 1971 Benjamin Franklin Hotel, Ballroom Foyer

9:00 AM Chairman: JAMES A. PETERS, (Division of Reptiles and Amphibians, U.S. Natural History Museum, Washington, DC 20560).

Hematological and Serological Studies on Sea Turtles. WAYNE FRAIR (The King's College, Briarcliff Manor, NY 10510).

Pesticide Residues in Snakes. DONALD F. CLARK, Jr., ROBERT R. FLEET and FREDERICK W. PLAPP (Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843).

Effect of Bile Pigments on Critical Thermal Maxima of Frogs. DUVAL A. JONES (Department of Biological Sciences, Carnegie-Mellon University, Pittsburgh, PA 15213).

The Physiological Responses of Western Diamondback Rattlesnakes to low Temperatures. HOBART F. LANDRETH (Department of Zoology, University of Oklahoma, Norman, OK 73111).

Biochemical Divergence in Isolated Populations of the Tree Lizard, Urosaurus ornatus. C. O. MCKINNEY, F. R. KAY, R. A. ANDERSON and W. L. ROUECHE (Department of Biology, University of Dayton, Dayton, OH 45409).

Reproduction in the Southern Alligator Lizard Gerrhonotus multicarinatus. STEPHEN R. GOLDBERG (Department of Biology, Whittier College, Whittier, CA 90608).

Behavioral Studies on the Green Turtle, Chelonia mydas, in the Sea. JULIE BOOTH and JAMES A. PETERS (National Museum of Natural History, Division of Reptiles and Amphibians, Washington, DC 20560).

A New Crotalus lepidus from West Central Mexico. JAMES R. DIXON and WILMER W. TANNER (Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843. Department of Zoology, Brigham Young University, Provo, UT 84601).

11:00 AM WILMER W. TANNER, President, Herpetologists' League (Department of Zoology, Brigham Young University, Provo, UT 84601).

BUSINESS MEETING.

WEDNESDAY, DECEMBER 29, 1971.
Benjamin Franklin Hotel, Ballroom Foyer

1:30 PM Chairman: T. PAUL MASLIN (President-Elect, Herpetologists' League)

Functional Aspects of Tongue Projection Mechanisms in Plethodont Salamanders. DAVID B. WAKE (Museum of Vertebrate Zoology, University of California, Berkeley, CA 90007).

Comments on the Distribution of Desmognathus fuscus in the Southern Appalachian Mountains. STEPHEN G. TILLEY (Department of Biological Sciences, Smith College, Northampton, MA 01096).

Characteristics of F1 Hybrid Tadpoles Between Six Species of Hyla. JON R. FORTMAN and RONALD ALTIG (Department of Zoology, Mississippi State University, State College, MS 39762).

Inverse Correlation of Rana sylvatica and Ambystoma opacum Larval Survivorship. C. ROBERT SHOOP and THOMAS L. DOTY (Department of Zoology and Institute of Environmental Biology, University of Rhode Island, Kingston, RI 02881).

Shift in Perch Height Characteristics of Anolis opalinus (Sauria, Iguanidae) Due to Congeneric Competition. THOMAS A. JENSSEN (Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061).

Bioenergetics of the Broad-headed Skink (Eumeces laticeps). EDWIN D. PENTECOST (Department of Zoology, University of Illinois, Urbana, IL 61801).

Biophysical Ecology of Large Reptiles: a Mathematical Model for Heat Flow Within the Body. JAMES A. SPOTILA and PAUL W. LOMMEN (Department of Zoology, University of Michigan, Ann Arbor, MI 48104).

Anoxic Tolerances of Five Species of Larval Amphibians. DIANA L. WEIGMANN and RONALD ALTIG (Department of Zoology, Mississippi State University, State College, MS 39762).

Annual Lipid Deposition-depletion Cycles in the Lizard Cnemidophorus tigris marmaratus (Sauria, Teiidae). FRED G. GAFFNEY and LLOYD E. FITZPATRICK (Department of Biological Sciences, North Texas State University, Denton, TX 76203).

Further Investigations on the Toxins of Taricha granulosa). EDMUND D. BRODIE, Jr. (Department of Zoology, Clemson University, Clemson, SC 29631).

An Extreme Degree of Transferrin and Albumen Polymorphism in a Population of the American Toad (Bufo americanus). SHELDON I. GUTTMAN and KENNETH G. WILSON (Department of Zoology, Miami University, Oxford, OH 45056).

THURSDAY, DECEMBER 30, 1971 Benjamin Franklin Hotel, Ballroom Foyer

9:00 AM Chairman: CLARENCE J. MCCOY (Chairman-Elect, SSAR)

Reproductive Variation Within a Single Subspecies of Painted Turtle Chrysemys picta belli Over a Large Geographic Area. JAMES C. CHRISTIANSEN and EDWARD O. MOLL (Department of Biology, Drake University, Des Moines, IA 50311).

Latitudinal Variation in Reproduction and Reproductive Cycles of the Painted Turtle, Chrysemys picta (Schneider). EDWARD O. MOLL (Department of Zoology, Eastern Illinois University, Charleston, IL 61420).

Repression of Egg-eating Behavior in Brooding Females of Desmognathus ochrophaeus. STEPHEN G. TILLEY and MARY G. AITAIO (Department of the Biological Sciences, Smith College, Northampton, MA 01060).

A Comparison of Incubation Periods of Turtles of the Western Great Lakes Region. MICHAEL A. EWERT (RR #2, Box #309, Bloomington, IN 47401).

Digestive Efficiency in the Herbivorous Lizard, Ctenosaurus pectinata. GAYLORD S. THROCKMORTON (Committee on Evolutionary Biology, University of Chicago, 5734 S. Ellis Ave., Chicago, IL 60637).

Bioenergetic Aspects of Herbivory in Lizards. F. HARVEY POUGH (Section of Ecology and Systematics, Langmuir Laboratory, Cornell University, Ithaca, NY 14850).

Ecological Energetics of Three Ectothermic Vertebrates. GARRY C. SMITH (Department of Biology, Furman University, Greenville, SC 29613).

The Saurian Renal Sexual Segment; a Functional Enigma -- Evidence for Sperm Sustenance. HECTOR S. CUELLAR, JAN J. ROTH, JAMES D. FAWCETT and RICHARD E. JONES (Department of Biology, University of Colorado, Boulder, CO 80302).

The Morphology of Reptilian Pancreatic Islets as Observed by Light and Electron Microscopy. WILLIAM A. RHOTEN (Department of Pathology, Washington University School of Medicine, 4550 Scott Ave., St. Louis, MO 63110).

Chromosomal Evolution of the Iguanid Lizard Genus Sceloporus. WILLIAM P. HALL III (Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138).

Computer Cards for Indexing Reprints. ROBERT C. FEUER and JOAN F. FEUER (Philadelphia College of Pharmacy and Science, Philadelphia, PA).

ADLER, KRAIG and DOUGLAS H. TAYLOR (U. Notre Dame and Miami U.).

Polarized Light: Detection Via Extraoptic Receptor and Its Use By Orienting Salamanders.

Tiger salamanders (Ambystoma tigrinum) were trained to move along a specific axis in an indoor tank under a polarized light (produced by a polarizing filter, HN-38 Bausch & Lomb). Orientation tests were performed indoors in a small water-filled arena which was completely enclosed in opaque plastic. Animals were placed individually in the center of the arena beneath the polarized light source, then released and allowed to move to the edge of the arena where they were scored. Directional responses of salamanders in the arena were the same with respect to the plane of polarization as they had been in training. Rotation of the polarization filter by 90° produced corresponding changes in the direction of movement.

Orientation to the plane of polarization can be demonstrated in sighted and eyeless animals. However, if opaque plastic is inserted over the skull of blinded animals, movement is at random; oriented movement is restored in these animals, however, when clear plastic is substituted. These studies suggest that the critical receptor for polarized light is extraoptic. (Adler supported by NSF GB-30647 and NIH Biomedical Support Grant FR07033-05; Taylor by an NSF Postdoctoral Fellowship, GU-2058)

BOOTH, JULIE and JAMES A. PETERS (Nat. Mus. of Natur. Hist.). Behavioral Studies on the Green Turtle, Chelonia mydas, in the Sea.

Abstract not received.

BRATTSTROM, BAYARD H. (Calif. State Coll.). Social behavior of some Australian Geckos.

Abstract not received.

BRODIE, EDMUND D., JR. (Clemson Univ.). Further investigations on the toxins of Taricha granulosa.

The level of toxicity was found to be two to four times greater than previously published (Brodie: Copeia 1968: 307): the methods were those previously described. It was found that 0.0001 to 0.00005 cc of back skin of Taricha granulosa injected intraperitoneally killed 20g white mice. Ova and liver tissue were also tested; 0.0005 cc of ova and 0.01 cc of liver were sufficient to kill white mice. After subjecting the toxin mixture to 110° C for 8 hours the level of toxicity was reduced by 10 to 25 percent. Thirty-six feeding experiments with snakes indicated that occasional individuals of Thamnophis sirtalis are able to eat Taricha as previously reported; despite this all Thamnophis sirtalis died after being force-fed Taricha. Supported by NSF - Gb -2496 to the Highlands Biological Station.

CARPENTER, CHARLES C. (Univ. Oklahoma).
Display-action-patterns in the iguanid genus Sceloporus.

Aggressive displays are species-specific time-motion performances. The ritualized action, termed the display-action-pattern, can be depicted graphically. Other display characteristics include postural changes and proportional movements of different parts of the body. The large iguanid genus Sceloporus contains approximately 60 species and 130 described formsranging widely over North America south to Central America. 15 subgeneric groups have been proposed on the basis of scale topography. Data, obtained by single-frame analysis of motion pictures, indicate display-action-patter sequences vary in being determinate or indeterminate, in the amplitude and the length of movements and pauses between movements, and in repetition. This film presents the display-action-patterns of 40 species, and action shots of 21 of these species, demonstrating display characteristics to be considered relative to phylogenetic affinities, allopatry and sympatry, and ecology.

CHRISTIANSEN, JAMES L. (Drake U.) and EDWARD O. MOLL (Eastern Ill. U.)
Reproductive variation within a single subspecies of painted turtle Chrysemys picta belli over a large geographic area.

Reproductive cycles of painted turtles were studied in Wisconsin and New Mexico for several years. The annual period of locomotor activity is shorter in Wisconsin than in New Mexico and food consumption ends before locomotor activity. The testicular cycle begins in July with maximum testicular size attained in August in both localities. Testicular regression begins in September with minimum sizes attained in spring. Testicular regression is not as severe in Wisconsin as in New Mexico. In general follicular growth occurs from March through June and ovulation and oviposition from May through mid-July. A period of ovarian quiescence lasts from early July through August and follicular growth begins again in September. The cycles differ in that the Wisconsin cycle is compressed with the quiescent period about one month shorter than in New Mexico. The mean clutch size for turtles from Wisconsin and New Mexico is 9 and 10 respectively. Approximately half the painted turtles in both localities produce two clutches of eggs per year and about 14% of those from New Mexico produce three. The larger clutch size in Wisconsin at least compensates for the additional clutch in New Mexico and results in comparable reproductive potentials in the two localities.

CLARK, D. R., JR., R. R. FLEET, AND F. W. PLAPP (TEXAS A&M U.). Pesticide residues in snakes.

Between 8 April and 5 September 1971, field studies were made of the snake faunas of riparian habitats associated with the two major rivers of Brazos County, Texas. Analyses for pesticide residues were made on 35 specimens of 10 species. Heavy residues (up to 1009 ppm) of DDT and related compounds were found in fat bodies of snakes from the Brazos River flood plain where these materials are being or have been used in cotton production. Only small residues (up to 14.6 ppm) were found in specimens from the Navasota River which drains land used for grazing. At each locality, higher residues were found in species of high trophic level that live in or feed from the water, whereas lower residues occurred in species of lower trophic level or those that feed away from water. Utilizing the information theory index $H_s = -\sum_{i=1}^{s} p_i \log p_i$, species diversity for the area of high concentrations is 1.634, whereas this value is 1.924 for the area of low concentrations. In the area of high pesticide use, only one record (a shed skin) from a total of 71 was of an oviparous species. By contrast, 7 of 43 records from the area of low usage were of egg-layers. The difference between ratios is highly significant (Yates' corrected $\chi^2 = 6.940$; $.01 > P > .005$). The data suggest that certain snake species, particularly egg-layers, have been eliminated from the Brazos River area by pesticides.

CUELLAR, HECTOR S., JAN J. ROTH, JAMES D. FAWCETT AND RICHARD E. JONES (Univ. Coloraro). The Saurian Renal Sexual Segment; a Functional Enigma - Evidence for Sperm Sustenance.

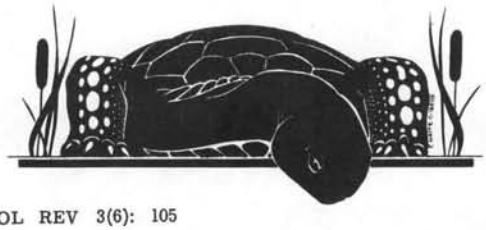
The sexual segment of the kidney of male lizards and snakes hypertrophies during the breeding season and in most species returns to a quiescent state between breeding periods. Its function is unknown. This study was conducted to determine if macerations of kidney sexual segment enhanced duration of sperm motility. Sperm suspensions from the epididymis of breeding male Anolis carolinensis were cultured in the following: 1) buffered saline alone, 2) buffered saline plus macerations of either male kidney containing a hypertrophied sexual segment or 3) female kidney containing no sexual segment, 4) buffered saline plus male liver, and 5) buffered saline plus male skeletal muscle. Only male kidney tissue significantly increased ($< .05$) the per cent of motile sperm over that found in sperm cultured in saline. It is possible that secretions from the sexual segment of the male kidney activate or provide nutrients for sperm.

DIXON, JAMES R. and WILMER W. TANNER (Texas A&M U.). A new Crotalus lepidus from West Central Mexico.

Abstract not received.

EWERT, MICHAEL A. (Indiana U.). A comparison of incubation periods of turtles of the western Great Lakes region.

In order to bioassay developmental rate, eggs from nine species were housed with those from a single population of Chrysemys picta belli and incubated to hatching at 25° and 30°C. Eggs were also incubated at variable temperatures including samples placed in field plots. Results indicate that overall development (from laying to hatching) at 25° and 30°C is most rapid in Clemmys insculpta and Chrysemys picta. Development of Chelydra serpentina and Sternotherus odoratus is 85-90% as rapid as that of the C. p. belli controls at both 25° and 30°C. That of Trionyx spp. is also 85-90% as rapid at 30°C but only about 70% at 25°C. Relative incubation times at variable temperatures paralleled results at the cooler constant temperature (i.e. C. insculpta among the briefest; Trionyx among the longest). Temperature independent increases in developmental rate with increasing latitude are evidenced in C. picta and S. odoratus. These findings are discussed in terms of thermal ecology, nest site selection and nest failure of the various species.



FEUER, ROBERT C. (Philadelphia Coll. Pharmacy & Sci.) and JOAN F. FEUER (Cox Inst., Hosp. of Univ. of Pa.). Computer Cards for Indexing Reprints.

Computer cards allow reprints to be indexed inexpensively, no matter how the reprints are filed (i. e. by author, number, or subject). Cross-indexing is easy. Disadvantages include the need to prepare cards on a key-punch and the need to use a card sorter at least occasionally.

FOLKERTS, GEORGE W. (Auburn Univ.). Ecotypic variation in salamanders of the southeastern U.S.

In the southeastern U.S., several species of salamanders contain variant populations which seem to be the results of ecotypic selection. These demes occur in habitats significantly different from those "typically" occupied by the species involved. The adaptive significance of the unique features sometimes seems apparent, but in other cases is obscure. Evidence indicates that certain of these ecotypes may have evolved in comparatively short periods of time. Species in which such populations are thought to occur include Desmognathus fuscus, Desmognathus aeneus and Eurycea bislineata. These presumed ecotypes are the cause of considerable confusion because (1) some have been thought of as distinct species, (2) they may appear to form polytopic subspecies, (3) they may be thought of as ecophenotypes, (4) they are difficult to distinguish from relict phenotypes.

FORTMAN, JON R. and RONALD ALTIG (Miss. St. U.) Characteristics of F1 hybrid tadpoles between six species of Hyla.

Twelve hybrid crosses were made involving Hyla avivoca, H. chrysoscelis, H. femoralis, H. gratiosa, H. cinerea, and H. squirella. Iridophore and melanic pigment patterns, oral papillae and labial teeth characteristics, and body proportions of the hybrids were compared with the parent species. The distinctive iridophore patterns of H. avivoca and H. cinerea were seen in all hybrids involving those species, and the tail patterns of H. avivoca, H. femoralis, and H. gratiosa were evident in the respective crosses. A long posterior third row of labial teeth is apparently a dominant trait. The A-2 gap ratio was too variable to be of use.

Frair, Wayne
Hematological and Serological Studies on Sea Turtles.

Samples of blood have been taken by cardiac puncture from the sea turtles, *Caretta c. caretta, Chelonia m. mydas, Dermochelys coriacea, Eretmochelys i. imbricata, Lepidochelys kempi* and *Lepidochelys olivacea*. Hematocrit readings have varied greatly but ranged into the 40's which are values higher than found among other turtles. Erythrocytes have sizes between 19μ length by 11μ width and 25.7μ length by 16.7μ width. Electrophoresis of serum on cellulose acetate and immunological reactions using rabbit antiserum indicate a relatively close affinity among the marine chelonians.

Gaffney, Fred G. and Lloyd C. Fitzpatrick. (North Texas State University). Annual lipid deposition-depletion cycles in the lizard Cnemidophorus tigris marmoratus (Sauria, Teiidae).

Rates and energetics of lipid deposition-depletion in adult male and female Cnemidophorus tigris from El Paso Co., Texas were followed during August, 1970 to August, 1971. Quantitative lipid changes in fat bodies, carcasses, livers, and ova indicate that lipids are used for overwintering and reproduction. Fatty acids in pre- and post- "hibernation" lizards were analysed. Males and females enter "hibernation" (late August) with a greater quantity of total body lipids than is present at emergence (mid May). In females total body lipids are maximum prior to vitellogenesis and minimum immediately following oviposition.

GOLDBERG, STEPHEN R. (Whittier Coll.). Reproduction in the southern alligator lizard Gerrhonotus multicarinatus.

A population of Gerrhonotus multicarinatus webbi was studied in the Puente hills, north of Whittier, Los Angeles Co., Calif. Histological examinations indicate that testes contain sperm from late February through late May. Three occurrences of mating were noted in the field: 24 March, 8 April, 5 May. A gradual errosion of germinal epithelium occurs during May. Spermiogenesis ceases by the beginning of June at which time germinal epithelium consists of spermatogonia and Sertoli cells. This condition remains unchanged during July. A proliferation of spermatogonia in August indicates the start of the new testicular cycle. Recrudescence is completed during September. These changes are shown by increased testicular size and the presence of large numbers of primary spermatocytes. Yolk deposition commences in late March and may be completed by mid-May. The period of egg-laying encompasses June and the first half of July. The first hatchling was collected 19 August indicating approximately eleven weeks are needed for completion of development under natural conditions.

GUTTMAN, SHELDON I. and KENNETH G. WILSON (Miami Univ., Ohio). An extreme degree of transferrin and albumin polymorphism in a population of the American toad (Bufo americanus).

A population of Bufo americanus from southwestern Ohio exhibited an extreme degree of transferrin and albumin polymorphism. One hundred and seventy-two individuals were collected from this population and their plasma transferrin and albumin phenotypes were determined by vertical acrylamide gel electrophoresis. Thirteen transferrin alleles were present in 36 phenotypes and 11 albumin alleles were present in 29 phenotypes. An excess of homozygotes occurred at both protein loci. This represents the greatest degree of heterogeneity ever reported for a vertebrate population.

Hall, W.P. (MCZ, Harvard). Chromosome evolution or the iguanid genus Sceloporus.

My data from 42 of 61 Sceloporus species, plus abundant comparative data of my own and from published sources, show that the "ancestral" karyotype of Sceloporus is 2n=34 [12 metacentric macrochromosomes, 22 microchromosomes with male heteromorphic sex chromosomes]. Karyological and electrophoretic studies of cryptic species in grammicus suggest that fixation of Robertsonian mutations (centric fissions or fusions) between populations is probably closely involved in speciation. Three independent lineages of such chromosomal speciation are recognized in Sceloporus: 1) An ancient one giving rise to merriami [2n=46]. 2) An old one from jalapae [2n=34] to the aeneus group [2n=24]. 3) A comparatively recent one from the orcutti group [2n=34], involving all of Smith's large-sized, large-scaled branch, to end branches in: a) the horridus and malachiticus groups [2n=22 in all], b) the clarkii group []n=40], and c) the crevice using branch; asper plus torquatus, megalepidurus, and grammicus groups [2n=32♀, 31X_1X_2Y'o]. Survival of karyotypic intermediates allows these sequences to be reconstructed in detail. The most recent burst of chromosomal speciation, involving a minimum of 6 cryptic species in grammicus, shows 2 lineages; to 2n=34♀, and to 2n=46♀.

JENSSEN, THOMAS A. (Va. Poly. Inst. & St. Univ.). Shift in perch height characteristics of Anolis opalinus (Sauria, Iguanidae) due to congeneric competition.

A shift in perch "preference" was found in Anolis opalinus between two geographic localities on Jamaica. In Mandeville, near the island's center, A. opalinus characteristically perches low (1.37± S.E. 0.09 feet). In Kingston, 65 mi east of Mandeville, A. opalinus is much more variable in its perch characteristics and perches significantly higher than in Mandeville. From extensive observation it was established that Anolis l. lineatopus (present in Kingston, but not in Mandeville) is responsible for displacing A. opalinus into higher perch sites in the Kingston area. Anolis l. lineatopus also perches low (3.31 ±S.E. 0.19 feet) and forces A. opalinus up when the two species come into immediate contact.

JONES, DUVALL A. (Carnegie-Mellon Univ.). Effect of Bile Pigments on Critical Thermal Maxima of Frogs.

Biliverdin is known to accumulate in the tissues of dozens of species of tropical frogs. This chlorotic condition appears to be normal for the affected species and frequently makes its appearance during metamorphosis. The green pigmentation is not visible externally in many of these species, so that its selective advantage is not entirely a matter of protective coloration. Since a large proportion of chlorotic species is exposed to high temperatures, the relationship between bile pigment concentration and temperature has been studied. Groups of Wisconsin Rana pipiens acclimated to 5° C. were injected with solutions of biliverdin or bilirubin in phosphate buffer (100 mg bile pigment/kg wet weight of frog), and placed in a water bath at 25° C. with control frogs. Condition and behavior of the frogs was noted as temperature of the water bath was increased slowly. The critical thermal maximum was determined by noting the temperature at which each frog lost the ability to right itself. Average CTM's were: control group - 34.8° C.; bilirubin group - 36.7° C.; and biliverdin group - 36.3° C. The t-test indicated that each treated group was significantly different from the control group. Field studies have shown chlorotic species of frogs to have higher CTM's than some non-chlorotic species.

LANDRETH, HOBART F. (U. Oklahoma). The Physiological responses of western diamondback rattlesnakes to low temperature.

Abstract not received.

LANDRETH, HOBART F. and MIKE T. CHRISTENSEN (Univ. Okla.) Orientation of the Plains Spadefoot Toad, Scaphiopus bombifrons, to Solar Cues.

The ability of plains spadefoot toads, Scaphiopus bombifrons, to use solar cues in orientation and learning directional goals was analyzed. Orientational tests were conducted with animals moving toward breeding sites and taken from breeding aggregations. Toads used the sun to guide their migrations to breeding aggregations and used a y-axis mechanism relative to a shoreline while breeding.

Training tests revealed that these anurans learn directional goals rapidly when the sun was the only apparent cue. Collection data reveal that this species can migrate at least a mile to breeding sites and that they are often active several days prior to heavy rains in the spring.

McKinney, Charles O., F. R. Kay, R. A. Anderson, and W. L. Roueche, III. (Univ. of Dayton). Protein variation in isolated populations of the tree lizard, Urosaurus ornatus.

Ten isolated populations of the tree lizard, Urosaurus ornatus from southern New Mexico and western Texas, were examined to determine the effects of isolation on protein variation. Starch gel electrophoresis techniques were used to evaluate variation in proteins controlled by 13 loci. The isolated populations were found to exhibit patterns of variability indicating genetic drift as well as patterns indicating that selection may be very important.

MOLL, EDWARD O. (Eastern Ill. Univ.). Latitudinal variation in reproduction and reproductive cycles of the painted turtle, Chrysemys picta (Schneider).

Populations of Chrysemys picta from the Mississippi drainage were sampled throughout the period of activity at various latitudes from northern Wisconsin to mid-Louisiana. Gonads were removed and examined histologically. Data concerning timing of the reproductive cycle, size and age at sexual maturity, number of eggs per clutch and number of clutches per year were compared for each collection locality. Generally, turtles in northern populations mature later, at a larger size, lay more eggs per clutch and fewer clutches per year than southern populations. Events of gonadal cycles are more crowded together with shorter periods of quiescence between cycles in northern populations. The observed variation is not clinal and appears to be inherent rather than induced by the environment.

PENTECOST, EDWIN D. (Univ. of Illinois). Bioenergetics of the broad-headed skink (Eumeces laticeps).

Existence metabolism in caged animals was determined for adult Eumeces laticeps, acclimated at temperatures of 22, 28, and 34°C, as the difference between the caloric value of food ingested (I) and the excreta lost (E) while maintaining constant weight. An increase in temperature resulted in a linear increase in existence metabolism. A comparison of regression coefficients for existence metabolism between males (1.084 cal./°C) and females (1.600 cal/°C) showed the females to be more affected by an increase in temperature than were the males ($p<.05$). No significant difference was found in the utilization coefficients $(\frac{I-E}{I})$ at different temperatures. A comparison of standard metabolism between 22° and 34°C acclimation groups showed no significant difference at three experimental temperatures. The effect of increasing temperature on standard metabolism was the same for both males and females. Females were found to have a higher weight specific metabolic rate at all experimental temperatures correlated with their lighter weight.

POUGH, F. HARVEY (Cornell University). Bioenergetic Aspects of Lizard Herbivory.

Most primarily herbivorous lizards are large species weighing 200 gms or more as adults. In many of these species the juveniles are more carnivorous than the adults. This generalization applies to the families Agamidae, Cordylidae, Gerrhosauridae, Iguanidae, and Scincidae. Weight-specific metabolic rate (MR) decreases with increasing body size. A 200 gm lizard would have a MR of 0.11 cc O_2/gm hr. Species with MR lower than this are primarily herbivorous, while those with higher MR are primarily carnivorous. Plant material contains less energy/unit weight than animal matter. I suggest that one factor determining the diet of a lizard species is its MR. A small species cannot obtain enough energy from an herbivorous diet to maintain its high MR. Other considerations include the energetic cost of capturing mobile animals compared to browsing on stationary plants, seasonal availability of food, and inter- and intrespecific competition. There are a few lizards weighing less than 200 gm that are primarily herbivorous. These species have specializations that offset the problems of high weight-specific MR. Modifications of the basic lizard pattern (leglessness, special feeding mechanisms, high MR) are associated with retention of a carnivorous diet.

PYLKA, JOSEPH M., JAMES A. SIMMONS and E. GLEN WEVER (Princeton Univ.). Sound Production and Hearing in the Rattlesnake.

Hearing in Crotalus v. viridis and sound production in nine species of Crotalus and Sistrurus were studied.

Sensitivity of the ear of C. v. viridis to airborne sound was studied by the cochlear potential method. This species is moderately sensitive to low tones between 80 and 400 Hz., and is insensitive to tones above 1 KHz.

The rattle of this species is a broadband noise generator producing most of its energy between 2 and 50 KHz. Little energy is produced below 1600 Hz. Total sound pressure level is 34 db re 1 dyne/sq. cm. Rattle frequency spectra of 8 other species of rattlesnakes were similar in exhibiting high levels at ultrasonic frequencies.

In addition to functioning passively as a warning signal, the rattle may also actively repel a potential mammalian predator by producing an intolerably loud sound field. By segregating its rattle frequency range from its hearing range, the rattlesnake may preserve the usefulness of this sensory modality.

RHOTEN, WILLIAM B. (Washington Univ.). The morphology of reptilian pancreatic islets as observed by light and electron microscopy.

Three major cell types have consistently been identified by light and electron microscopy of reptilian pancreatic islets. Four examples of three extant orders will be discussed: Anolis carolinensis and Laticauda semifasciata (Squamata), Caiman fuscus (Crocodilia), and Pseudemys scripta (Testudines). The tinctorial properties of the three cell types at the light microscopic level are similar in all animals, as determined by staining with aldehyde fuchsin-trichrome(AF-T) and phosphotungstic acid-hematoxylin(PTAH), or by silver impregnation. The A cells were ponceau-acid fuchsin and PTAH positive, and did not blacken with the silver method used. B cells were aldehyde fuchsin reactive and gave a negative reaction with PTAH or silver nitrate. D cells were stained pale green in AF-T preparations and were blackened by silver. At the electron microscopic level, A cells usually contained large, electron opaque secretory granules which were round to oval in profile. The secretory granules of B cells were of variable morphology, but usually round with diversified internal profiles. D cells usually had the smallest, in diameter, secretory granules of the three major cell types, but in Anolis the D granules were large. In addition, D granules had a round profile and a moderately electron opaque matrix separated from the limiting membrane by a narrow electron lucent space. The number and distribution of A, B, and D cells are similar by light and electron microscopy. (Grants:AM11407,GM00897)

SHOOP, C. ROBERT and THOMAS L. DOTY (U. Rhode Island). Inverse correlation of Rana sylvatica and Ambystoma opacum larval survivorship.

Adult and larval population of wood frogs (Rana sylvatica) and marbled salamanders (Ambystoma opacum) were studied over a two year period. The breeding pond was surrounded by a fence with traps along each face. Predation on Rana eggs, embryos, and tadpoles by A. opacum was observed during the first year. High embryo mortality of A. opacum the second year corresponded with an almost 50 fold increase in R. sylvatica surviorship to the dispersal stage. Relative number of other potential Rana predators were similar each year. These data indicate that A. opacum may play a major role in regulation of the R. sylvatica larval population size.

SMITH, GARY C. (Furman Univ.). Ecological energetics of three ectothermic vertebrates.

Comparisons were made of the energy budgets of three ectothermic vertebrates found in Southeastern U.S. The three species studied were Elaphe guttata, Heterodon platyrhinos and Bufo terrestris. Values for assimilation, ingestion, growth, shedding, metabolism and reproduction were converted to caloric units and integrated into energy flow models for each species. Assimilation efficiencies for the three species were 88.9 per cent for E. guttata, 83.9 percent for H. platyrhinos, and 73.7 per cent for B. terrestris. Regression slopes of metabolism per animal hr. for the three species were 0.70 for corn snakes, 0.79 for southern toads, and 1.04 for hognosed snakes. Reserves of fat in the fat bodies were lowest in the spring for all species and coincided with periods of maximal reproduction. Egg clutches comprised approximately 42 per cent of the total caloric value of the females of all three species. Comparisons of energy flow in the three species revealed that ingestion methods (A= I - E) gave significantly higher and more reliable results than production-respiration methods (A= P + R) for all three species.

SPOTILA, JAMES R. and PAUL W. LOMMEN (U. of Michigan). Biophysical Ecology of Large Reptiles: A Mathematical Model for Heat Flow Within the Body.

A mathematical model for heat conduction through large reptiles was developed. The animal was considered to be a large cylinder with a central core surrounded by several layers of insulating muscle and fat. The number and thicknesses of these layers were changed and different conductivity values were used in order to account for the effects of changes in heart rate, vaso -dilation, vaso -constriction, variations in the conductivity of flesh, and other physiological parameters that affect heat flow in real animals. The model relied on an iterative mathematical procedure in which heat in, heat out and heat stored were determined for each layer and the core during a specified time period. This yielded the final temperatures of the core, insulating layers, and outer surface at the end of the time period. A reptile with a central core diameter of 80 cm surrounded by several layers of insulation 10 cm thick, would show a diurnal change in deep body temperature of 0.77°C if exposed to the thermal and radiative environment of a typical mid-July day in south Florida. Such large reptiles would approach the condition of homeothermy due to their large body size. Seasonal changes in the physical environment would be more important than short term changes.

THROCKMORTON, GAYLORD S. (Univ. of Chicago) Digestive Efficiency in the Herbivorous Lizard Ctenosaura pectinata

Food passage rates and digestibility coefficients ($\frac{\text{cal. consumed - cal. excreted}}{\text{cal. consumed}} \times 100$) were determined for four specimens of Ctenosaura pectinata fed sweet potatoes (Inpomea batatas) over a six week period. Body temperature was recorded continuously for 24-hour intervals at various times throughout the study. The animals were weighed at two-week intervals. Kodak Opaque red pigment was used as a marker to determine the rates of food passage and to mark the beginning and end of collecting periods. Collecting periods averaged seven days. Preliminary results suggest that the apparent digestibility coefficient for Ctenosaura pectinata fed sweet potato is approximately 82%. The animals maintained themselves within an average daytime temperature range between 36° - 39°C. The weight change for the animals in a two-week period was 1-5% of total body weight. The food passage rate under these conditions was four days.

TILLEY, STEPHEN G. (Smith Coll.). Comments on the distribution of Desmognathus fuscus in the southern Appalachian Mountains.

A desmognathine salamander, here referred to Desmognathus fuscus Green, inhabits small streams and seepages at intermediate elevations in the Great Smoky and Unicoi Mountains of North Carolina and Tennessee, and the Whitetop-Mt. Rogers area of Virginia. While it may occur in other ranges along the northwestern border of the southern Blue Ridge, search for it in the Unaka Mountains and ranges southwest of the Unicois has been unsuccessful. It likewise appears to be absent in the interior of the southern Blue Ridge Physiographic Province. It is an abundant salamander in the Great Smoky Mountains, where previous reports of its absence may stem from its similarity to D. ochrophaeus and D. monticola. Experience with D. fuscus in two drainage systems in the Great Smokies indicates that it may be replaced ecologically by D. ochrophaeus at high elevations, while at intermediate elevations it displaces D. ochrophaeus from the types of brooding sites utilized by that species elsewhere in the southern Appalachians. The rarity of D. fuscus at low elevations may result from scarcity of proper habitat, but the factors restricting its general distribution in the southern Blue Ridge are otherwise obscure.

TILLEY, STEPHEN G. AND MARY G. ALTALO (Smith Coll.). Repression of egg-eating behavior in brooding females of Desmognathus ochrophaeus.

The salamander Desmognathus ochrophaeus exhibits oophagy in the laboratory and in the field. Females actively brooding their clutches repress the tendency to consume live eggs, of their own or of foreign clutches. Feeding is not repressed with the onset of brooding behavior, but is restricted by suppression of foraging activity. Repression of oophagy in brooding females is thus not due to a general suppression of feeding activity. The presence of a dead egg in her clutch may incited a brooding female to resume oophagy, which may result in the consumption of a few live eggs after consumption of the dead one. Disturbed females may also consume their eggs. Brooding females discriminate between live eggs and other food, between live and dead eggs, and between newly hatched larvae and other food. The presence of the female's clutch seems to be an important factor in the repression of oophagy. Males, gravid and non-gravid females, brooding females taken from their clutches, and juveniles do not discriminate between any of the above and actively feed upon eggs of their own species.

WAKE, DAVID B. (Univ. of California, Berkeley) and LOMBARD, R. ERIC (Univ. of So. California). Functional aspects of tongue projection mechanisms in plethodontid salamanders.

Mechanisms for rapid, long-distance projection of the tongue have evolved in two groups of plethodontid salamanders, the Hemidactyliini and Bolitoglossini. Both have free tongues, long epibranchial cartilages, large projection muscles and specialized intrinsic tongue musculature. The groups differ from each other in several important ways. Special features of this apparatus in dynamic sequence follow: 1) a bulb-like Subarcualis rectus I muscle squeezes the tapered epibranchial to propel the hyobranchial apparatus and tongue pad out of the mouth; 2) paired tractriform channels passively collapse the expanded hyobranchial apparatus and determine the angle of projection; 3) tendons lock the apparatus in a folded, linearly compact form upon compression; 4) a modified Rectus abdominis muscle, extending uninterruptedly from the pelvis to the tongue, is carried out of a complex coil and contracts to instantly return the apparatus to the mouth. In the hemidactyliines a muscle unlocks the apparatus as it is retracted; this muscle is lacking in the bolitoglossines where unlocking is passive. In bolitoglossines the projection channel is extended anteriorly and forms a muscular cylinder. This acts as an efficient aiming device. Lubrication is provided by serous glands on the ventral surface of the tongue pad (Supported by NSF Grant GB 17112).

WEIGMANN, DIANA L. and RONALD ALTIG (Miss. St. U.) Anoxic tolerances of five species of larval amphibians.

Specimens were subjected to anoxic water for specified periods of time and then removed to water at room conditions for one-half hour. Then the number of dead specimens (ecological plus absolute) were counted. Survival under these conditions was used as an index of ecological tolerances and preferenda of the species tested. Results generally agree with what is known of the ecology of the species, e.g., small Siren intermedia and large Ambystoma maculatum were similar and much more tolerant than tadpoles of Gastrophryne carolinensis, Acris gryllus, or Hyla chrysoscelis.

CURRENT HERPETOLOGICAL TITLES, XVIII: 1970 - 1971

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We have brought to your attention more than 13,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1970-1971) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be even more current. We hope that the added numbers will serve to reduce the titles-per-issue to a more manageable number.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 17 July through 31 August 1971. Periodical title abbreviations follow the American Standard for Periodical Title Abbreviations Z 39.5-1963 (American National Standards Institute, Inc., New York).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and L. Greene. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

No commercial computer service yet offers all of the facilities that we need and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 36 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

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HERPETOLOGISTS RECORD

CHROMOSOME PREPARATIONS OF AMPHIBIANS AND REPTILES: IMPROVED TECHNIQUE. -- Development in recent years of new techniques or new combinations thereof have allowed efficient examination of bone marrow chromosomes in a variety of vertebrates. James L. Patton (1967, J MAMMAL, vol 48, p 27) described a very useful procedure for mammals, which is often referred to as the colchicine, hypotonic citrate, air dried (or flame dried) technique. Lowe, Wright, and Cole (1966, MAMMAL CHROM NEWSL, no 22, p 201) modified this procedure for efficient use specifically on amphibians and reptiles. Two modifications designed to accommodate working with poikilotherms rather than homeotherms were mentioned in that paper: (1) stress the peripheral circulatory system in order to stimulate blood cell production in the marrow of experimental animals; and (2) incubate the stressed animals for 20 to 30 hours at a temperature approximating their preferred temperature. Two additional modifications that have been used widely are: (1) after placing the extracted marrow into one per cent sodium citrate, allow it to sit at room temperature for 30 minutes; and (2) for anurans, use half the dose of colchicine used for lizards (and other reptiles) (Cole, Lowe, and Wright, 1968, COPEIA, no 1, p 96).

We have been experimenting with intraperitoneal injections of several chemicals in order to improve the stress aspect of this procedure, which is most critical for consistently obtaining dividing marrow cells in acceptable quantities. We have succeeded with three agents: (1) bacterial endotoxin (from Escherichia coli; suggested and donated by Richard K. Root, Chief, Infectious Disease Section, Department of Medicine, University of Pennsylvania School of Medicine, Philadelphia); (2) phenylhydrazine; and (3) an active culsure of yeast. We sought a replacement for the first two agents because they are relatively inconvenient to use and may pose some unnecessary hazards (Dr. Root informed us that phenylhydrazine may be absorbed through human skin and can cause anemia in humans as well as other vertebrates). Thus, we are most pleased with the use of yeast because it clearly provides the desired response (numerous dividing cells), it does not expose ourselves to any risks, and it is inexpensive and readily obtained and applied in the field with a minimum of effort.

We use a commercial yeast (Fleischmann's) that is sold in grocery stores for baking purposes. Thoroughly mix (by means of vigorous shaking in a centrifuge tube) one-half cc yeast and one-half cc table sugar with seven cc luke warm tap water and allow to sit for one-half hour to one hour at room temperature. Thoroughly mix this once again immediately prior to use. Then inject this solution into the experimental animals 20 to 30 hours prior to sacrificing them, and incubate them at the proper preferred temperature after injecting the yeast.

Dosage of the yeast solution varies according to species and size, but it is not so sensitive as to require weighing the animals prior to injection -- "guestimates" of doses consistently suffice. For guidelines, we use 0.5 cc for an average sized Saeloporus undulatus weighing approximately 15 g, 0.8 cc for a Rana pipiens weighing 25 g, and 1.5 cc for a Thamnophis sirtalis weighing 30 g. -- Charles J. Cole and Carol R. Leavens, DEPT HERPETOLOGY, AMER MUS NAT HIST, NEW YORK 10024.

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In **Bangkok**, some of the citizenry is up in arms over reports that one of **Deputy Prime Minister Prapass Charusathiara's** pet crocodiles has escaped into a canal that people use for bathing. His spokesman said it wasn't so, and that the story, which appeared in an Opposition newspaper, was aimed at embarrassing Mr. Charusathiara. Nevertheless, people along the canal are going bathless, just in case a crocodile is lurking about, and one resident was said to be trying to catch the reptile by using a dog as bait.

ALBIN KREBS.

NEW YORK TIMES
21 September 1971

TERMITE INSPECTOR FINDS BOA NO BORE

Termite inspectors sometimes find things you would hardly believe, said Robert I. Rush, general manager of Animal Regulation.

Rush made his remarks in announcing an unusual sale scheduled today at the North Hollywood Animal Shelter, 13131 Sherman Way.

A termite inspector crawling under the home of Paul McGuire, 8100 Cedros Ave., Van Nuys, made the sale possible.

He reappeared quickly and was "white as a sheet," according to McGuire.

"You do have strange termites," he blurted before city animal control officer David Leon was summoned.

Leon crawled under the house and captured the 4-foot boa constrictor which will be available for sale today. Purchase price is $3.98 plus a $15 fee for a wild animal permit.

UNREVIEWED-UNEDITED COMMUNICATIONS

A POSSIBLE CASE OF MIMICRY IN FROGS

Craig E. Nelson and Gene A. Miller

Two species of frogs, which may represent a case of mimicry, were collected together approximately one-half mile east of Kanashen, Guyana (1 deg. 47 min. N, 58 deg. 33 min. W). Both species are terrestrial and were captured in midday while fleeing ahead of the field party.

The two species have similar dorsal coloration and flash colors. Lithodytes lineatus (Leptodactylidae) displays broad yellow dorsolateral lines which begin on the snout, extend through the upper eyelid, pass above the forelimb, and terminate at the dorsal edge of the groin. It has red-orange flash spots in the axilla, groin, and on the back of the thigh. The dorsum and venter are otherwise generally black, and the limbs are dark tan with black spots.

Phyllobates femoralis (Dendrobatidae) has yellow dorsolateral lines in the same relative position (but narrower) as those of L. lineatus. It has an orange axillary spot and a short orange stripe which extends from the groin over the base of the thigh and onto its posterior face. P. femoralis has black dorsal coloration with a faint tan wash, and dark tan limbs with dark spots only on the proximal part of the thigh. Unlike L. lineatus, P. femoralis has a creme ventro-lateral stripe which extends from the axilla to the groin, and a black and white mottled venter and a ventro-lateral cream-colored spot below the chin and side.

L. lineatus and P. femoralis have generally congruent ranges along the northwestern margin of the Amazon basin. Cochran and Goin (1970) cite specimens of L. lineatus from Ecuador, Colombia, and Guyana, and of P. femoralis from Peru, Guyana, and Colombia. Rivero (1961) lists Venezuela and Trinidad for L. lineatus -- regions where P. femoralis has not been reported. Dr. James P. Bogert (personal communication) reports both species from Iparia, Peru, and Dr. William E. Duellman (personal communication) reports both from Santa Cecelia, Ecuador.

Phyllobates are noted for their extremely toxic skin secretions (Savage, 1966). L. lineatus has the dorsal surfaces studded or shagreened with small glandular tubercles (Rivero, 1961; Cochran and Goin, 1970); this suggests that it might also have protective dermal secretions. If the resemblances between L. lineatus and P. femoralis are mimetic, it might thus be either Batesian or Mullerian.

The only other case of mimicry thus far suggested for amphibians is in salamanders (Huheey, 1960; Huheey and Brandon, 1961; Orr, 1967, 1968).

ACKNOWLEDGEMENTS: Mr. Steve Edwards identified the Phyllobates. Reverend H. R. Ketchem facilitated work at Kanashen. The field work was supported by National Science Foundation Grant GB-6204.

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UNREVIEWED-UNEDITED COMMUNICATIONS

THE HEMIPENIS OF THE ONION-TAIL GECKO *THECADACTYLUS RAPICAUDUS* (HOUTTUYN)

H.G. Dowling, T.C. Majupuria, & F.W. Gibson

Although Cope (1896) was able to present a remarkably clear summary of the hemipenial morphology of lizards in his single study of this subject, some of the individual descriptions are erroneous or misleading. /This is not surprising, considering the poorly-prepared material and primitive optical equipment available to him./

He described (1896: 464) the hemipenes of gekkonids as follows: "In these the organ is short and wide, appropriately to the fragility of the tail. It is also more or less deeply divided into two branches. The entire surface is calyculate, generally minutely so. In *Thecadactylus* each fork has three strong welts. "[etc.]

Although portions of Cope's descriptions were carried over into later systematic works (e.g., Camp, 1923), no subsequent worker appears to have reexamined the hemipenis of *Thecadactylus rapicaudus*. We present here a re-description of the hemipenis of this species, because in some important respects our observations differ from Cope's report. The description is drawn from examination of three everted specimens prepared from fresh material (HGD 797, 798; Trinidad) and the dissection of two preserved specimens (AMNH 64526, 64527) to determine the aspect of the inverted organ and the origin of the retractor muscles.

The hemipenis is short, with the breadth of the two lateral lobes about equal to the total length of the organ (length and breadth of one specimen are each 10 mm). The muscle retractor penis originates on the first (postcloacal) caudal vertebra. As in most lizard hemipenes, the organ can be differentiated into three regions: base, pedicil, and capitulum. The unornamented base and the folds that differentiate it from the pedicil were obscured by the tied thread in the prepared specimens, and are not shown in the figure (Fig. 1).

The sub-cylindrical pedicil has a slightly granular surface, but is essentially unornamented. The lips of the sulcus are distinctly raised, but are also unornamented in the pedicil region. The capitulum is extremely well-distinguished, and is almost completely restricted to the sulcate (medial) side of the organ. It is made up of two large auriculate lobes that are connected across the apex by a third, transverse lobe. The lateral lobes are ornamented with very small, spinulose calyces that are largest at the edges of the lobes and smallest toward their centers (but some of the calyces near the sulcus also are enlarged). The calyculate areas of the sulcate side are separated from the unornamented asulcate side by a fairly well-defined flounce, giving much the appearance of the "capitate" hemipenes of certain South American snakes (Dowling & Savage, 1960: Fig. 63).

The sulcus spermaticus extends from the base of the organ in a straight line toward the apex. When it reaches the capitulum it appears to give off a branch onto each lateral lobe and then continues for a short distance onto the transverse, apical lobe. Each of the lateral branches occupies a deep furrow in a central, depressed area of the lateral lobes. This trifurcate nature of the sulcus does not appear to have been noted previously.

Cope (1896: 464) apparently did not observe the apical (transverse) lobe of the capitulum in his preparations, and thus also missed the trifurcate nature of the sulcus. The entire organ is more accurately described as trifid rather than "divided into two branches." Rather than the "entire surface /being/ calyculate," these structures are restricted to the sulcate side of the lateral lobes of the capitulum. The "welts" seen by Cope in his inverted preparations apparently become the raised edges of the lateral lobes in everted preparations.

The features described for *Thecadactylus* appear distinctive among the hemipenes studied to date, but additional lizards of the Family Gekkonidae will have to be studied to determine what phyletic value can be placed upon them.

This paper is Contribution Number 2 of a proposed series of studies on the hemipenes of the Sauria (see Literature Cited for Number 1). We thank Charles W. Myers for his comments on the paper, Richard G. Zweifel, Chairman, Department of Herpetology, American Museum of Natural History (AMNH) for providing space and facilities, and Robert G. Goelet, President of the New York Zoological Society, for making possible Majupuria's stay in the United States. Some of the specimens are in the private collection of H. G. Dowling (HGD).

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[Received 31 August 1971.]

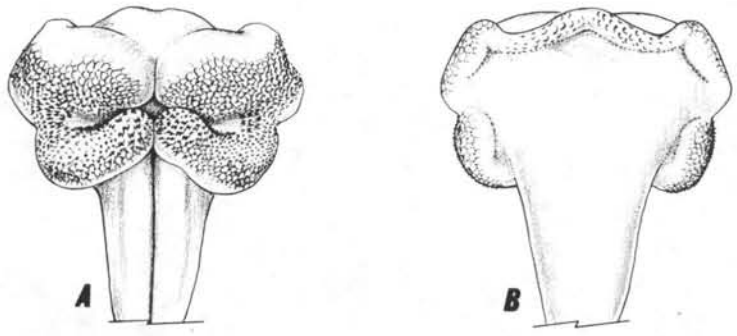


FIGURE 1. Hemipenis of *Thecadactylus rapicaudus*. A. Sulcate (= medial) view, showing the highly differentiated capitulum with three lobes and the apparently trifurcate sulcus. B. Asulcate (= lateral) view, showing the flounce that distinguishes the capitulum.

UNREVIEWED-UNEDITED COMMUNICATIONS

NOTEWORTHY HERPETOLOGICAL RECORDS FROM HONDURAS

Donald E. Hahn

Herpetological collecting trips were made to Honduras during August of 1969 and June of 1971. I was accompanied by Dr. and Mrs. Larry D. Wilson on the first trip, and the greatest bulk of time was spent collecting on the Bay Islands, with short trips to departmentos Choluteca, Francisco Morazan, and Olancho. The results of the Bay Island collections are being reported on separately by Wilson and myself. In 1971 the late Mr. Robin L. Dutson and I collected 555 specimens in the deptos. Copan, Comayagua, Cortes, El Paraiso, Francisco Morazan, Islas de La Bahia, La Paz, Lempira, Ocotepeque, and Santa Barbara. A few of these represent noteworthy range extentions or are uncommon species known from only a few localities.

The herpetofauna of Honduras, long poorly known, has recently been the subject of extensive studies by Drs. John R. Meyer and Larry D. Wilson, hopefully to be published soon. The following records add to the information in Meyer's doctoral dissertation, "A Biogeographic Study of the Amphibians and Reptiles of Honduras," 1969, Univ. Southern California, 589 pp.

Special attention should be given to our collections made in deptos. Lempira and La Paz along the border with El Salvador, which, herpetologically speaking, undoubtedly represent two of the more poorly known areas in the country. The known herpetofauna of Depto. La Paz, for exgmple, consisted of only two species, Elaphe triaspis and Centrolenella fleischmanni. Marcala, a small town in southwestern La Paz, is at approximately 2330 meters elevation in the coffee zone at the lower edge of the pine area. A deep swift stream flows through town and most of the immediate area has been cleared and planted in coffee and bananas. The following species were taken in the vicinity of Marcala and all but the Centrolenella represent new departmental records:

Rana pipiens
Hyla staufferi
Smilisca baudinii
Bufo coccifer
Bufo marinus
Leptodactylus melanonotus
Physalaemus pustulosa
Hypopachus variolosus
Centrolenella fleischmanni
Kinosternon scorpioides
Anolis crassulus
Anolis tropidonotus
Basiliscus vittatus
Sceloporus variabilis
Dryadophis dorsalis
Leptodeira annulata

Anolis crassulus (DEH 7123) was previously known from Honduras only from the immediate area about La Esperanza, Depto. Intibuca. Sceloporus squamosus (DEH 7052) was also taken in Depto. La Paz at 1 km. E La Paz (town).

The previously known herpetofauna of the Depto. Lempira consisted of 1 turtle, 5 lizards, and 6 snakes, all from the vicinity of Gracias. Erandique, a small opal mining town in southeastern Lempira lies at about the same elevation as Marcala and is also surrounded by pines. Species collected there include:

*Rana pipiens
*Bufo coccifer
*Bufo marinus
*Physalaemus pustulosa
*Leptodactylus melanonotus
*Mabuya mabouya
Ameiva undulata
*Anolis laeviventris
*Anolis sericeus
*Basiliscus vittatus
Sceloporus variabilis
*Dryadophis dorsalis

An * indicates this species had not been previously recorded from this department.

The Erandique record for Anolis laeviventris (DEH 7285) is the third for Honduras, the other localities being in deptos. Intibuca and Francisco Morazan. This specimen was taken on a rock wall in a pine area.

The collection made in Gracias, Depto. Lempira, consisted of only three species: Bufo marinus, Sceloporus variabilis, and Mabuya mabouya.

Records of note from other portions of the country include the following:

Gonatodes fuscus. Depto. Francisco Morazan: Tegucigalpa (DEH 6143-47). Meyer (1969) listed only two localities for this lizard in Honduras, one from the Caribbean coast (Depto. Colon: Trujillo) and the other from the Pacific coast (Depto. Valle: San Lorenzo). The Tegucigalpa specimens were taken from cracks in buildings along the Choluteca River, which flows through the city. This is the first inland record for this lizard in Honduras.

Sphaerodactylus continentalis. Depto. Comayagua: Pito Solo (DEH 7003). This specimen represents a southern range for Honduras and a departmental record. This lizard was taken from a bromiliad along Lake Yojoa.

Sphaerodactylus dunni. Depto. Cortes: Mts. west of San Pedro Sula (DEH 6925). This is the third locality from which this little-known species has been taken. It was found climbing on a road cut just below the cloud forest in the late afternoon.

Lampropeltis triangulum. Depto. Copan: Copan at Ruins (DEH 6957). This species has not previously been recorded from this

department, and is known from only nine other localities in Honduras.

Pliocercus elapoides. Depto. Comayagua: 7 km. SE Taulabe (DEH 6985). This snake was previously known from only three localities in Honduras, all in Depto. Yoro. The specimen was found DOR in the early morning in a pine area.

Sibon carri. Depto. Francisco Morazan: 66.5 km. S Tegucigalpa (DEH 6176). This specimen represents the fourth known Honduran locality for this rare snake. It was taken AOR during a light rain at night.

Bothrops godmani. Depto. Francisco Morazan: Cerro La Tigra, ca. 10 mi. NNE Tegucigalpa (DEH 7026). This is the seventh locality from which this uncommon species has been taken in Honduras. It was taken at the base of a waterfall in cloud forest. The specimen disgorged a large rodent upon capture.

I would like to thank Dr. Wilson for reading this manuscript and offering helpful suggestions, as well as examining many of my specimens. Dr. Meyer also has my appreciation for identifying a number of specimens.

Laboratory
MARCUS J. LAWRENCE MEMORIAL HOSPITAL
Cottonwood, AZ 86326



NOTICE

November 3, 1971

Herpetologists
c/o Herpetological Review

Dear Sirs:

The University of Kansas is seeking candidates for two vacancies (effective 1 July 1972) in the Division of Biological Sciences. Each position consists of a half-time appointment in both the Museum of Natural History and Department of Systematics and Ecology.

One of the positions is in Herpetology, the other in Mammalogy; each carries the title of Curator in its respective Division. The new Curator of Herpetology will be associated with Dr. William Duellman, and the new Curator of Mammals will be associated with Dr. Robert Hoffmann.

Research interests of candidates should be in one or more of the following fields:

1. Quantitative and theoretical ecology.

2. Quantitative systematics.

3. Functional morphology and biomechanics.

One of the two successful candidates must have a background in multivariate statistics.

Teaching duties will include courses in the area of research specialty, and will, from time to time, involve undergraduate biology courses.

Duties, rank, and salary will be commensurate with qualifications and experience. Candidates should send one copy of their curriculum vitae, four letters of recommendation, reprints of recent publications, and any other supporting documents they wish to Robert S. Hoffmann, Chairman, Department of Systematics and Ecology, University of Kansas, Lawrence, Kansas 66044.

A. J. Rowell, Convenor
Systematics and Ecology
Search Committee

Museum of Natural History
THE UNIVERSITY OF KANSAS
Lawrence, KS 66044

BOOK REVIEW

THE LAST OF THE RULING REPTILES. By Wilfred T. Neill, 1971. Columbia University Press, New York and London. xvii + 486 pp., 162 fig. $15.95.

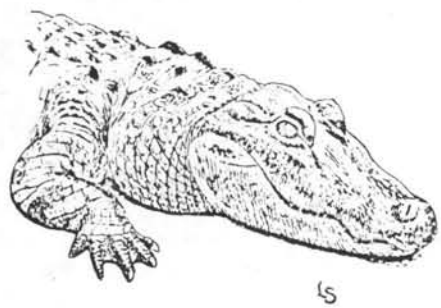
This book might well be subtitled "All you wanted to know about crocodilians now that it's too late." The inheritors of the archosaurian lineage are nearing extinction throughout the world, and this may be the last book about them to be written by someone with first hand knowledge of most of the living species in the field or in captivity. Wilfred Neill is not only a herpetologist of vast experience; he is also knowledgeable and literate in several other areas of biology and in anthropology, and this book reflects the breadth of his experience.

His main thesis is that few herpetologists have studied living crocodilians in the field, and those who have done so have often been unduly influenced by preconceived ideas, anthropomorphism, and folklore. Other scientists have accepted their observations uncritically and in some cases extrapolated from them until a great deal of erroneous information on the biology of crocodilians is current in the scientific community. This theme introduces the book and is elaborated on in the fourth section which deals extensively with the natural history of the American alligator. Whether one accepts Neill's views or not, it is clear that some reevaluation is in order on such topics as nesting habits of crocodilians and defense of young, alligator bellowing and the vocalizations of other species, the significance of the musk glands, gastroliths, and various food items, and the territorial behavior of these reptiles. Neill himself is not entirely consistent. In some chapters he stresses the stereotyped, unvarying nature of crocodilian behavior patterns; in others he cites examples of how these patterns can be rapidly changed by contact with man.

Other sections of the book include an excellent summary of the fossil history of the Crocodilia and their ancestors, some provocative thoughts on crocodilian distribution and ecology, and a somewhat irrelevant chapter on bipediality in reptiles. The final section of the book treats sequentially all the existing crocodilian species except the American alligator. While some accounts, notably those of the American crocodile, estuarine crocodile, and New Guinea crocodile, are better than others, this is the best single source of information on the little known crocodiles and alligators of the world. There is an excellent bibliography. The book is profusely illustrated. Nearly every crocodilian species is depicted, often as an adult and a juvenile, and skulls of both Recent and extinct species are figured. There are interesting photographs of crocodilian habitats and behavior and distribution maps for every species. Intermixed with these are photographs of a variety of other creatures from caterpillars to sea birds that are, in many cases, only tangential to the main theme of the book.

Neill is pessimistic as to the future of the crocodilians. He predicts that all will be extinct as wild animals by the end of this century as a result of hide-hunting and the modification of habitat. The last pages of his text should be read by those who popularize the cause of ecology and conservation. Personally I believe that most of the world's crocodilians can yet be saved in small enclaves, although their role in shaping tropical ecosystems is about played out. They are nevertheless worth saving as survivors of an ancient era that have left their mark on human culture. When the last crocodilian vanishes from the earth, man's world will be, in some subtle way, diminished.

SHERMAN A. MINTON
INDIANA UNIVERSITY MEDICAL CENTER
Indianapolis, IN 46207



ALLIGATOR MISSISSIPPIENSIS
(From a label at the New York Zoological Park)

BOOK REVIEW

AMPHIBIANS AND REPTILES OF KENTUCKY. By Roger W. Barbour. University of Kentucky Press, Lexington 40506. x + 334 pp. 110 color and 127 black & white photographs plus maps.

Profusely illustrated with 237 photographs (110 in color), this book fills a geographic gap in our knowledge of the herpetofauna of eastern North America, and provides the layman with an easy-to-read text on the 99 species of reptiles and amphibians found in Kentucky. The excellent color photographs of each species are a feature not previously available in any popular "state" herpetology. The species accounts are well organized with sections on recognition, variation, habitat, comments on Kentucky distribution, life history, and remarks. A map for each species shows its entire range in the United States.

The author has written this book to "enable a non-professional to identify any

amphibian or reptile native to Kentucky and to enable him to learn something of its distribution and life history." He has partially succeeded in fulfilling those objectives. The keys are comprehensive and, coupled with the numerous photographs, should allow easy identification of all adult species of Kentucky herpetofauna. Unfortunately, there are no keys to larval salamanders or tadpoles, although a brief description of these is usually included under life history. The life histories are as complete as our varying knowledge of the life styles of reptile and amphibian species permits. Information for the layman on the distribution of these animals in Kentucky leaves much to be desired. An understanding of the distribution of reptiles and amphibians in Kentucky would have been greatly enhanced by the use of Kentucky range maps only, instead of showing the entire range of each species in the United States, since this latter range is easily determined by using Conant's Field Guide to the Reptiles and Amphibians (1958).

Certain other basic improvements (along with the addition of more specific range maps) might have been made. This book is written for the non-professional. As such it is unfortunate that the author did not rigidly adhere to standardized common names (i.e. 1956, Conant et al. Common names for North American amphibians and reptiles, Copeia 3: 172-185). I noted twenty common names at the beginning of species accounts which do not conform to the current standardized names in use, the most obvious of which was the incorrect common name "Rattlesnake" (p. 314) for Crotalus horridus instead of the correct name "Timber Rattlesnake." Standardization of common names must be followed if herpetologists are to bring about stability in use of these terms.

The introduction is rather short, and acknowledgements are virtually non-existent. The table of contents is nearly useless due to its brevity. Contents for a book of this nature would be more useful if pagination were included for at least each genus mentioned. For example, a person turning to the Colubridae on page 225 is confronted with a section covering 78 pages and 28 species of snakes! Further, the table of contents assumes that the layman is familiar with reptiles and amphibians at the familial level, whereas most non-professionals would find a listing of the standardized common names much more useful.

This book would have been greatly improved by the inclusion of a history of herpetological exploration of the state of Kentucky including information about the work of investigators such as Rafinesque, Garman, and Funkhouser. This type of information added importantly to recent state herpetological works such as those by Smith (1961, The amphibians and reptiles of Illinois, Illinois Nat. Hist. Surv. Bull. 28(1): 298 pp.) and Webb (1970, Reptiles of Oklahoma, Stovall Mus. Pub. 2: 370 pp.).

The author refers frequently in the species accounts to the various physiographic provinces in Kentucky and includes a map of these (on page 8), but unfortunately does not include a detailed description of the actual physiographic provinces in Kentucky nor does he discuss their influence on the distribution of the total herpetofauna of the state. It has been proposed by Hirschfeld (1963, The Bluegrass Physiographic Province and its influence upon the distribution of Kentucky amphibians and reptiles, Journ. Ohio Herp. Soc. 4(1-2): 63) that certain reptiles and amphibians avoid the Bluegrass Physiographic Province in Kentucky, and a detailed discussion of this aspect of Kentucky herpetology alone would be valuable.

Little or passing mention is made by the author on subspecific and specific variation in the species of reptiles and amphibians in Kentucky. Detailed analysis of variation of many forms occuring in Kentucky such as Notophthalmus viridescens, Desmognathus fuscus, Plethodon dorsalis, Rana clamitans, Pseudacris triseriata, Kinosternon subrubrum, Chrysemys scripta, Diadophis punctatus, Coluber constrictor, Elaphe obsoleta, Lampropeltis getulus, Lampropeltis doliata (=Lampropeltis triangulum), Storeria dekayi, Natrix erythrogaster, Natrix sipedon, Agkistrodon contortrix, and Crotalus horridus would contribute much to an understanding of character variation in these species not only in Kentucky but throughout their entire range. An example is a recent paper on Virginia valeriae in Kentucky (Pisani and Collins, 1971, the smooth earth snake, Virginia valeriae (Baird & Girard), in Kentucky, Trans. Kentucky Acad. Sci. 3(1-2): 16-25) which shows that the two subspecies of this form in Kentucky appear to be separated by a hiatus in their range and exhibit no evidence of intergradation although previous workers show their range as meeting in Kentucky and indicate that intergradation takes place over a broad area.

The selected bibliography contains over 180 entries, most of which pertain directly to Kentucky herpetology or which definitely contain references to the state's herpetofauna. This listing, however, is by no means complete. I am aware of over 350 specific citations on Kentucky reptiles and amphibians in the literature.

In summation, the book overall is a definite contribution to knowledge of the reptiles and amphibians of Kentucky, but much remains to be done before a detailed understanding of distribution, specific and subspecific variation, and life history, will be available for the herpetofauna of the Commonwealth of Kentucky.

JOSEPH T. COLLINS

Museum of Natural History
UNIVERSITY OF KANSAS
Lawrence, KS 66044

HERPETOLOGY AT NOTRE DAME

Studies on the biology of amphibians and reptiles at Notre Dame have continued to broaden with the addition of new faculty and facilities, especially in the areas of behavior, physiology and anatomy. The new Life Sciences Building, which triples the biology department's space, is now completed and occupied; this offers an exceptionally well instrumented and integrated structure for most types of modern research. Special facilities available specifically for herpetological work include several programmable environmental chambers, cold rooms, recording and data processing equipment, apparatus for rearing and maintaining living animals, and extensive reprint collections. Additional training and testing tanks for studies on photoreception and orientation are now being built on the roof of the building.

ROBERT E. GORDON (PhD Tulane) continues his studies on locomotor activity of salamanders and lizards, as well as his work on the breeding biology of the green salamander (Aneides aeneus). JOSEPH A. TIHEN (PhD Rochester) has returned to his paleontological studies, having completed a five-year term as editor-in-chief of the American Midland Naturalist, a journal published by this department. Tihen's current interests center around the Miocene faunas of Montana and the relationships and history of Tertiary North American salamandrids. He also maintains his interest in the evolution of the toads of the genus Bufo. KRAIG ADLER (PhD Michigan) pursues his systematic and biogeographic studies on the herpetofauna of southern Mexican cloud forests and his work on the reproductive biology of tropical plethodontid salamanders. His primary research interests concern light receptors (especially extraoptic ones) and environmental cues used by amphibians and reptiles in activity rhythms and for compass orientation, studies recently funded by the NSF. DOUGLAS H. TAYLOR (PhD Mississippi State) was lately associated with Adler on a 15-month NSF postdoctoral fellowship, studying the involvement of the plane of polarized light and the use of pineal photoreceptors in amphibian orientation. Adler and Taylor filmed much of this work, preparatory to making a documentary on orientation mechanisms in lower vertebrates to be deposited with the behavioral films lending library at Pennsylvania State University. Taylor has now taken a position as assistant professor of zoology of Miami University. SUE A. BINKLEY (PhD Texas) has been involved in some of the amphibian rhythm work with Adler and Taylor, especially in developing new techniques for the analysis of rhythmic data much of which will appear in her forthcoming book on rhythm analyses. KENYON S. TWEEDELL (PhD Illinois) is continuing his research on amphibian pathology, specifically the transmission of renal tumors in frogs. Two newly appointed faculty members also concern themselves with amphibians and reptiles. THOMAS L. POULSON (PhD Michigan), in addition to his major interests in the physiological ecology of cave organisms, has studied the respiratory physiology of lizards. ROBERT P. FIORINDO (PhD California at Berkeley), an endocrinologist, is studying the hypothalamic control of prolactin secretion in reptiles and other vertebrates.

A descriptive brochure on the department and its graduate program may be obtained on request from the Administrative Assistant, Department of Biology, University of Notre Dame, Notre Dame, Indiana 46556, USA. A list of available papers on lower vertebrates by Notre Dame faculty and students can be obtained from the same source.



MEETINGS AND SOCIETIES

CALENDAR 1972

June.....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Boston.

July.....SALAMANDER SYMPOSIUM, Highlands Biological Station, North Carolina.

August...Combined Meeting: HERPETOLOGISTS' LEAGUE AND SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, University of Oklahoma Biological Station, Lake Texoma.

24-30 September...INTERNATIONAL CONGRESS OF ZOOLOGY, Monaco.

CALENDAR 1973

4-11 August FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

INDIVIDUALS AND INSTITUTIONS

MAX A. NICKERSON has moved from Arkansas State University to Head of the Vertebrate Division, Milwaukee Public Museum.

K. V. THIRUVATHUKAL (Lewis Coll., Lockport, IL) and his students have been studying the thymus glands of snakes and Necturus.

CLIFFORD R. JOHNSON has moved from the University of Queensland to the University of New England (Armidale, N.S.W., Australia) where he has a fellowship, with GRAHAM WEBB, to work on the role of cardiac flow-pattern in reptilian thermoregulation and oxygen transport.

Mr. & Mrs. STEPHEN WINKSELBAUM (3010 Clarendon Rd., Brooklyn, NY) announce the birth of a daughter, NAJA KATHLEEN, on 14 September.

WILLIAM H. WOODIN announced his retirement as Director, Arizona-Sonora Museum. His successor is MERVIN W. LARSON.

THE SOCIETY OF THE SIGMA XI

The Society of the Sigma XI announced today through the Chairman of its Grants-in-aid of Research Committee, Dr. Harold G. Cassidy, an award to Mr. Steven P. Christman of the University of Florida, Gainesville.

This award has been made to Mr. Christman to assist him in his study of "Biogeography of Florida reptiles."

Dr. Cassidy, in making this announcement, stated "Sigma XI each year makes a number of grants to promising scientists at critical points in their research careers. We recognize that many needs are relatively too small for the large foundations to consider, yet to the scientist himself the need may be critical. It is to meet these needs that our research fund is maintained."

ALSO IN 1970-72

Jeffrey H. Black, University of Oklahoma. A survey of the subterranean invertebrate fauna of limestone and gypsum caves in Oklahoma. $200.

Donald R. Clark, Jr., Texas A & M University. A radio-telemetric study of movements and thermal ecology of two species of large snakes. $100.

Elizabeth K. Blatt, Concord College, Athens, West Virginia. Melatonin concentration in the brain of stirnorganectomized. *Rana pipiens*. $200.

James P. Bogart, Louisiana Tech University. Effect on chromosomes in tadpoles caused by irradiation of developing gametes in parent frogs. $200.

Edmund D. Brodie, Jr., Clemson University. Defensive behavior of salamanders of the genus *Ambystoma*. $250.

Stephen R. Edwards, University of Kansas. Quantitative phyletics of the genus *Colostethus* (Anura: Dendrobatidae). $200.

William H. Gehrmann, Tarleton State College, Stephenville, Texas. Sites of extrathyroidal iodine fixation in the cervical region of the collared lizard *Crotaphytus collaris*. $100.

Ronald C. Gratz, University of Notre Dame. The effects of incubation temperature on scutellation in the lizard *Anolis carolinensis* (Lacertilia: Iguanidae). $100.

(TO BE CONTINUED.)

MEMBERS DESIDERATA

LINDA E. MAXSON (Dept. of Biochemistry, Univ. of Calif. Berkeley, 94720) would like to receive live South American hylids or serum samples for immunological studies. Locality data would be appreciated.

MEMBERSHIP IN THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

Membership is open to anyone interested in amphibians and reptiles.

Regular dues are $8 for persons living in the United States and Canada, $6 for those in other countries.
Sustaining Members pay $10, and Contributing Members $15.
Institutional Subscription, $16.

Write: HENRI C. SEIBERT
Treasurer, SSAR
Department of Biology
Ohio University
Athens, Ohio 45701

MEMBERSHIP IN THE HERPETOLOGISTS' LEAGUE

All persons interested in herpetology are eligible for membership.

Dues are $8 for Regular Members, $10 for Fellows. Institutional Subscription, $15.

Write:
HOBART F. LANDRETH, Secty-Treas.
Herpetologists' League
Department of Zoology
University of Oklahoma
Norman, OK 73069

SUBSCRIPTION TO THE CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

A loose-leaf series of species accounts of the amphibians and reptiles of the Americas, with special emphasis on those in the United States and Canada.

The Binder, Index Tabs, and all 100 accounts published to 1970 cost $18.00 to individuals, $20.00 to institutions. Subscription to the 25 accounts to be published in 1971 is an additional $5 for individuals, $7 for institutions.

Write:
H. G. DOWLING, Chairman
Herpetological Catalogue Comm.
Amer. Mus. Nat. Hist.
New York, N.Y. 10024

CHANGES OF ADDRESS

Please inform us of your address changes as soon as possible. Each returned copy of HERPETOLOGICAL REVIEW costs us (and you) about 25 cents more in postage and considerably more in handling.

Send address changes directly to:

HERPETOLOGICAL REVIEW
Genera of Reptiles Project
American Museum of Natural History
New York, N.Y. 10024

We will see that changes go to the mailing lists of SSAR, Herpetologists' League, and CATALOGUE, as well.

ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be type-written on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $23.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

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A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

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These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

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herpetological REVIEW

THE NEWSLETTER ON AMPHIBIANS AND REPTILES...
AND THE PEOPLE WHO STUDY THEM

VOLUME 3, NUMBER 5
OCTOBER 1971

S S A R

The Society was founded in 1958 as THE OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communications between amateur and professional workers.

Membership is open to anyone interested in amphibians and reptiles. Members have voting privileges in the Society; they receive the JOURNAL OF HERPETOLOGY, HERPETOLOGICAL REVIEW, and issues of the Facsimile Reprint Series. They also receive reductions on the price of other Society publications. See the last page of this issue for information on membership and subscriptions.

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AMPHIBIANS AND REPTILES

and the

HERPETOLOGISTS' LEAGUE

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HERPETOLOGISTS' LEAGUE

The Herpetologists' League is an international organization established by Major Chapman Grant in 1936. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1970 it had 940 members and fellows, 24 life members, 10 honorary members, and 400 institutional subscriptions to its journal, HERPETOLOGICA.

All persons interested in herpetology are eligible for membership. Members receive HERPETOLOGICA (and now HERPETOLOGICAL REVIEW), to which they can submit manuscripts for publication. They may also present papers at the Annual Meeting.

See the last page of this issue for information on membership and subscriptions.

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Herpetological Review

VOLUME 3, NUMBER 5

OCTOBER 1971

ARTICLES

84 HERPETOLOGICAL PAPERS AT THE FIFTH LATIN AMERICAN CONGRESS OF ZOOLOGY.

UNREVIEWED-UNEDITED COMMUNICATIONS

91 HEMIPENIAL MORPHOLOGY OF THE TREE LIZARD, PLICA PLICA, by H. G. Dowling, T. C. Majupuria, & F. W. Gibson.
93 EFFECTS OF DIFFERENTIAL PRESERVATION ON DERMAL PUSTULARITY OF THE MICROHYLID FROGS, GASTROPHRYNE AND HYPOPACHUS, by Craig E. Nelson.
94 INFLUENCE OF TRAP COVER TYPE ON PITFALL TRAPPING OF LIZARDS, by William S. Parker.
95 THE TADPOLE RANA PILEATA, by W. Ronald Heyer.

96 ARBOREAL HABITS OF BUFO VALLICEPS AND OTHER BUFONIDS, by Jaime Villa.
97 BEHAVIOR OF LIZARDS IN AN ARTIFICIAL SHADE MOSAIC, by Kenneth K. Asplund.

DEPARTMENTS

LETTERS TO THE EDITOR
82 Hutchison on "Egg-alga Relationships."

83 REPORT FROM THE JOINT COMMITTEE ON COOPERATION.

87 CONSERVATION: TURTLES IN THE NEWS.

88 REGIONAL SOCIETIES PAGE

89 GEOGRAPHIC DISTRIBUTION PAGE: An Initial List.

T-71 CURRENT HERPETOLOGICAL TITLES.

NEWS AND ANNOUNCEMENTS
89 Recent Publications.
90 Photograph: Albuquerque Meeting.
99 Individuals and Institutions.
100 Members' Desiderata.
100 Lost Members
89 CORREGENDA: (HR 3(4): 71-72).

SOCIETY NOTES
2nd Cover Masthead
3rd Cover Advice to Authors
Membership and Subscriptions
Address Changes

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LETTERS TO THE EDITOR

ON THE AMBYSTOMA EGG-ALGA RELATIONSHIP

The unreviewed-unedited paper by Anderson, Hassinger and Dalrymple on "The egg-alga relationship in Ambystoma t. tigrinum" (1971 HERPETOL REV 3(4): 76) should be commended for its heuristic intent, but calls for some criticism of the methods and conclusions.

The more rapid rate of development, greater viability, and higher survival rate of eggs of Ambystoma maculatum reported by Gilbert 1942. ECOLOGY 22(2): 215-227; 1944. ECOLOGY 25(3): 366-369) were later confirmed by Hutchison and Hammen (1958. BIOL BULL 115(3): 483-489). In the 1958 paper we showed that the symbiotic relationship was not due to respiratory gas exchange and suggested that the higher metabolic rates and more rapid development of embryos associated with the alga must depend on some growth factor produced by the alga. In a later paper (Hammen and Hutchison. 1962. LIFE SCI 10: 527-532) we reported the results of studies with C-14 on carbon dioxide assimilation and showed that the "facultative mutualism of Ambystoma embryos and the alga Oophila is not simply one of photosynthetic carbon dioxide fixation by the alga with subsequent transport of labeled carbohydrate to the embryo". We concluded "that this physiological mutualism involves some growth factor produced by the alga in relatively small concentrations."

Anderson et al noted the occurrence of the alga only by visual observation. The alga is often present in eggs in considerable numbers without being apparent to the unaided eye; microscopic examination of the egg is necessary to determine actual occurrence. The increase in frequency of algal infestation with season observed by Anderson et al may have been due to an increase of algal density to a degree visible to the naked eye. I have found upon microscopic examination that the alga is often present during gastrulation, although it is not visible to the unaided eye, and that almost invariably, the density of the alga increases until hatching. If the egg-alga relationship is due to some growth factor produced in minute amounts as our earlier work suggests, then an algal density not sufficient to be seen with the naked eye could still be adequate to enhance egg development and survival.

The juxtaposition within the same sentence of the statements by Anderson et al that they found no beneficial effects of the alga and that they "in fact found a consistent correlation of the alga with higher mortality" might lead an unwary reader to conclude that the death of the embryos was caused by the alga. There is no evidence whatsoever that this is the case. The density of alga cells does increase greatly within the egg envelopes after the embryo dies, not before.

The earlier investigations under controlled laboratory conditions in pond water have shown that the alga does benefit the embryo; Anderson et al offer no valid data to show that this relationship does not also hold under field conditions. I agree that workers should note the occurrence of the alga in egg masses in the field, but only after microscopic examination. Temperatures are also important, but should be taken within the egg masses since the temperature of the masses often may be appreciably higher than the surrounding water. The amount of light reaching the eggs at different times of the day and season is also of importance in influencing the growth of the alga and should be measured and compared.

Victor H. Hutchison
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POLL OF HERPETOLOGISTS

IF YOU HAVE NOT YET FILLED IN THE POLL FORM (H R 3(3): T58, June 1971), PLEASE DO SO NOW AND SEND IT IN!

The Joint Committee on Cooperation needs additional information on the wishes of the membership before its next meeting in December. Only 148 replies were available at the August meeting, and only 195 have arrived to date (11 September).

THE PHILADELPHIA HERPETOLOGICAL SOCIETY

INVITATION TO THE

EAST COAST HERPETOLOGICAL SOCIETIES JOINT MEETING

Tuesday,

December 28, 1971

AT THE

PHILADELPHIA ZOO'S NEW REPTILE HOUSE

Participating Societies

Philadelphia Herpetological Society
Virginia Herpetological Society
Northern Virginia Herpetological Society
Maryland Herpetological Society
Connecticut Herpetological Society
New York Herpetological Society

On December 28 and 29, 1971, the Herpetologists' League, together with the Society for the Study of Amphibians and Reptiles will be holding their annual sessions in Philadelphia.

We are joining in with these professional organizations at this time and have set up a meeting for the morning of December 28. We will gather at the new Reptile House on the grounds of the Philadelphia Zoo at 34th Street and Girard Avenue at 10:00 o'clock A. M. There will be remarks from the officers of the societies present and then Dr. Roger Conant will take us on a tour of this most modern reptile facility.

Following that, Philadelphia Herpetological Society will provide a buffet lunch and will then go to the Benjamin Franklin Hotel where the two professional societies will have a session for the presentation of scientific papers.

Come to Philadelphia on December 28, 1971, for a day which may well prove to be the beginning of a new era of cooperation between the professional and the amateur or regional herpetological groups.

REPORT FROM THE JOINT COMMITTEE FOR COOPERATION OF THE HERPETOLOGISTS LEAGUE AND SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Executive Council of HL and the Board of Directors of SSAR approved the formation of a joint committee during the AAAS meetings in Chicago in December, 1970. The appointed members met for the first time in Chicago and again during the SSAR meetings at Albuquerque in August, 1971. During the intervening period a large volume of correspondence was transmitted between members of the Committee and with other interested persons.

The Committee has explored ways for increasing cooperation between the two herpetological societies to achieve greater benefits for the members of each organization. The current joint support of Herpetological Review and co-sponsored meetings in Albuquerque and Philadelphia are evidences of increasing cooperation.

The most conclusive form of cooperation, of course, would be amalgamation of these societies into one new organization. Such a move, with all of the attendant problems, has been discussed by the Committee. The primary concern in the considerations has been provision of the most services possible for the "membership dollar," and the effects of unification on present and future services to the membership are being studied in detail. Therefore, before this Committee can make a recommendation on amalgamation, the financial details must be fully analyzed. Since the financial status of both organizations for the current year will not be clear until December, the committee hopes to make a recommendation on the feasibility of amalgamation after a meeting in Philadelphia during the last week of December. If unification is recommended, the Committee will also present a Constitution and By-laws for the new organization, and a timetable for accomplishing the change.

The voting membership of both societies must approve any proposed change, in accordance with present constitutional requirements.

Should the Committee not recommend amalgamation, or if amalgamation were recommended but not approved by the members of both societies, the Committee would continue to study other joint activities of potential benefit to the herpetological community. The Committee earnestly solicits opinions or suggestions concerning any phase of cooperative activity, including amalgamation, from the members of HL and SSAR; comments may be sent to Victor H. Hutchison, Department of Zoology, University of Oklahoma, Norman, Oklahoma 73069.

The Committee is composed of Kraig Adler, Herndon G. Dowling, Robert E. Gordon, Hobart F. Landreth, Clarence J. McCoy, Henri C. Seibert (represented by Ronald Brandon at Albuquerque), Wilmer W. Tanner, and Victor H. Hutchison (Chairman).

HERPETOLOGICAL PAPERS PRESENTED AT THE FIFTH LATIN AMERICAN CONGRESS OF ZOOLOGY IN MONTEVIDEO, URUGUAY

October 18 - 23, 1971

[C. J. McCoy, Carnegie Museum, attended these sessions, and kindly provided these translated abstracts. - Ed.]

ACHAVAL, FEDERICO (Facultad de Humanidades y Ciencias, Montevideo, Uruguay). The genus Clelia in Uruguay.

The author presents descriptions and synonymies, and notes on coloration and distribution of Clelia occipitolutea and C. rustica, based on specimens in Uruguayan collections.

BARRIO, A. (Instituto Nactional de Microbiologia "Carlos G. Malbran", Buenos Aires, Argentina), F. A. SAEZ and PRIMAROSA RINALDI CHIERI (Instituto de Investigacion de Ciencias Biologicas, Montevideo, Uruguay. Cytogenetics of Chthonerpeton indistinctum (Gymnophiona: Typhlonectidae).

A cytogenetic study of Chthonerpeton indistinctum, an amphibian of the order Gymnophiona, is presented. The diploid number of chromosomes in both sexes is 2n=20. The karyotype consists of five pairs of metacentric chromosomes, four pairs of submetacentric chromosomes, and one pair of telocentric chromosomes. Meiotic behavior reveals the presence of annular bivalents and non-terminal chiasmata similar to those of urodeles, and the existence of a major spiral approaching that of anurans. The low number of chromosomes and absence of microchromosomes, united with biological and anatomical characters, brings us to the conclusion that C. indistinctum is a species phylogenetically advanced over I. glutinosus and U. narayani, at this time the only other apodans studied from the point of view of cytogenetics. Morphologically differentiated sex chromosomes, such as occur in the other orders of amphibians, were absent in all meiotic preparations.

BLAIR, W. FRANK (University of Texas, Austin, Texas, U.S.A.). Some aspects of evolution in the genus Bufo.

Abstract not available.

BRUM DE ZORRILLA, NADIR and WALDO VENEGAS (Instituto de Investigacion de Ciencias Biologicas, Montevideo, Uruguay). Rapid technique for study of somatic and meiotic chromosomes in amphibians.

A rapid technique for study of somatic and meiotic chromosomes in anuran amphibians is described. By means of the action of collagenase on the connective tissue and collagen fibers surrounding the seminiferous tubules it is possible to obtain a good cellular dispersion which facilitates immediate observation of chromosomes in different stages of the meiotic process.

DONOSO-BARROS, ROBERTO (Universidad de Concepcion, Chile). Agressive behavior in Calyptocephalella caudiverbera (Linnaeus).

Examples of the giant frog of Chile upon being stimulated, and at times spontaneously, exhibit behavior reminiscent of the ceratophridian frogs. Individuals raise themselves on extended legs and move laterally, emitting strong agressive calls and attempting to bite. This behavior is found in adult males and females, and in transforming individuals. Sonographic study reveals a typical agressive call similar to that of the ceratophridians.

DONOSO-BARROS, ROBERTO (Universidad de Concepcion, Chile). Contribution to knowledge of the genus Aruncus Philippi.

This genus, described by Philippi at the beginning of the century (1902), was revealed clearly through the plates published by Cei (1958). The type-species of the genus is Aruncus valdivianus Philippi, and despite some differences attributable to technical difficulties of the early naturalist, the description is identifiable with material extant in the collection of the Universidad Austral. Therefore it is convenient to re-establish the name Aruncus valdivianus for the species known as Telmatobufo australis. A second related species is Telmatobufo bullocki Schmidt, the type-species of Telmatobufo. In searching for the type-specimens of Philippi I found the type-specimen of Bufo venustus, which is identical with Telmatobufo bullocki, resulting in bullocki becoming a synonym of Bufo venustus (=Aruncus venustus). In this latter species the middle ear is absent, as in Alsodes monticola, and its swimming strokes are very anomalous. The geographic distribution of Aruncus is extended from the province of Nuble to Malleco and Arauco in the Cordilleran Forest.

DONOSO-BARROS, ROBERTO (Universidad de Concepcion, Chile). The genera Ctenoblepharis and Phrynosaura.

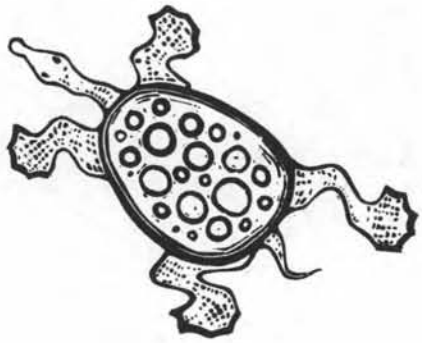
These genera of lizards, described originally from the desert regions of northern Chile and Peru, have been considered distinct. The opportunity to review the type-specimen of Ctenoblepharis adspersus Tschudi in the collection of the Museum of Neuchatel (Switzerland), and the type-specimen of Phrynosaura reichei Werner in the Zoological Museum of the Universidad de Concepcion, permitted me to confirm the validity of both species, and to reach the conclusion that Ctenoblepharis Tschudi and Phrynosaura Werner are congeneric. Thus the genus of Werner, for reasons of priority, must be considered a synonym of Ctenoblepharis, the older name (1845).

FABIAN, MARTA ELENA (Museu Rio-Grandense de Ciencias Naturais, Porto Alegre, Brasil). Contribution to knowledge of the cranial osteology of Liophis Wagler (Serpentes, Colubridae).

Osteological characters are of great importance in systematic studies of snakes. In view of this, differences in cranial osteology between the species Liophis anomalus (Guenther), Liophis jaegeri (Guenther), Liophis miliaris (Linnaeus), and Liophis occipitalis (Jan), are presented. The principal characters studied are numbers of maxillary, palatine, pterygoid, and mandibular teeth, length of the maxillary diastema, and proportions of supratemporal and quadrate bones.

FREIBERG, MARCOS A. (Buenos Aires, Argentina). Two new species of terrestrial tortoises (genus Geochelone) from Argentina.

Abstract not available.



GALLARDO, JOSE M. (Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina). Origin of the South American amphibian fauna.

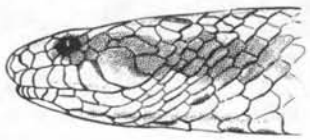
In considering this problem it is necessary to keep in mind the important role played in determining distribution by the interrelated factors of climate, topography, distribution of water bodies, soils, vegetation, feeding, reproductive behavior, and development. Given these data, three sources of origin can be recognized in the South American amphibian fauna. A) Guianan-Brazilian, reaching northward to Central America and southern United States and southward to northeastern Patagonia, containing the greatest number of species. B) Paleartic, represented by several species of Bufo (B. variegatus and related forms) from western South America. C) Patagonian (actually Andean-Patagonian), probably of Australian ancestry, with an appreciable number of species. The Guianan-Brazilian batrachofauna (the richest of the three) differentiated in certain refuges to the level of species or subspecies, and later dispersed radially and convergently through hydrographic systems (Bufo granulosus, Pseudis paradoxus, and others), a pattern of speciation also seen in certain mammals (Primates), birds, lizards, and some insects (Lepidoptera).

GARCIA, DANIEL (Museo Nacional de Historia Natural, Montevideo, Uruguay). Confirmation of the presence of Liophis occipitalis (Jan, 1863), in Uruguay.

The presence of Liophis occipitalis in Uruguay is confirmed by the acquisition of a specimen from the Department of Artigas. Previously the species was known from two specimens mentioned by Devincenzii (1925), one with only the data "Uruguay", and the other from the Department of Cerro Largo, constituting the first records for the country but remaining unverified until the present.

MANE-GARZON, FERNANDO and ORLANDO GIL (Facultad de Humanidades y Ciencias, Montevideo, Uruguay). Sessile papilloma of the gall bladder in a turtle from Uruguay, Phrynops geoffroyana (D. & B.).

Considering the extreme rarity of tumours in reptiles, especially in chelonians, a papilloma of the gall bladder found in a turtle from Uruguay, Phrynops geoffroyana (D. & B.) is described, including macroscopic and histological characteristics which identify it as a benign fibropapilloma.



OREJAS-MIRANDO, BRAULIO and DANIEL GARCIA (Museo Nacional de Historia Natural, Montevideo, Uruguay). Cyclagras gigas, a new species of snake (Serpentes, Colubridae) for Uruguay.

This species has been reported from an extensive area of tropical America, limited in the south by northern Argentina, Paraguay, Bolivia, and northeastern Brazil, and extending throughout northern South America, east of the Andes. Although the type-locality (Corrientes, Argentina) suggests the proximity of this species to Uruguay, the southernmost localities previously reported are those of Freiberg (1939) who studied specimens from La Paz and Parana, western Entre Rios, near the border of Santa Fe, Argentina. In 1959 a specimen of Cyclagras gigas (Dumeril, Bibron and Dumeril) was collected at Paso Pache, Department of Florida, Uruguay, and later donated to the National Museum of Natural History in Montevideo, where it bears number 1457. This specimen extends the known range of the species toward the southeastern part of South America.

SACCONE, ROBERTO (Luis B. Cavia 2745, Montevideo, Uruguay). List of vertebrates now extinct or with problems affecting populations in Uruguay.

A list of birds, mammals, and reptiles is presented, with discussion of the general evolution of populations and the probable causes which resulted in or are resulting in the diminution of each species.

SAEZ, F. A. and W. VENEGAS (Instituto de Investigacion de Ciencias Biologicas,

Montevideo, Uruguay). Cytogenetics of Rhinoderma darwini (Amphibia, Anura).

A cytogenetic study of the anuran amphibian Rhinoderma darwini, the "sapito vaquero" of southern Chile, is presented. The karyotype consists of 2n=26 chromosomes which may be arranged according to relative size in six large pairs and five small pairs. Analysis of meiosis reveals distal chiasmata, from which is inferred restriction of crossing-over and a large degree of linkage, limiting recombination. Sex chromosomes were not found. Other work relating to systematics and the meiotic process is discussed.

STERN, CLAUDIO (Francisco Soca 1514, Montevideo, Uruguay). Chromatic variation with age in Lystrophis dorbignyi (Dumeril, Bibron and Dumeril, 1854) (Serpentes, Colubridae).

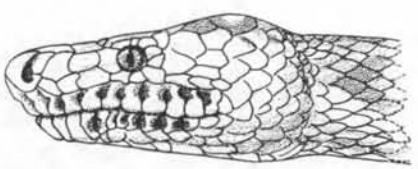
Chromatic variation with age was observed in a series of Lystrophis dorbignyi. In adults there appears, in the lateral black spots, a red coloration that is completely absent in juveniles. This red coloration occurs every 6 to 9 ventral scales, from the neck to the anal area. Since this chromatic variation does not correlate with ecological preference or with sex of the individuals, it must be considered ontogenetic variation.

VAZ-FERREIRA, RAUL and ANNELISE GEHRAU (Facultad de Humanidades y Ciencias, Montevideo, Uruguay). Aggregations and behavior of tadpoles of Leptodactylus ocellatus (L.).

Aggregations of tadpoles of Leptodactylus ocellatus (L.), forming groups of more than one thousand individuals, are found in temporary water bodies in Uruguay. These aggregations display compact form, moving at times through shallow areas. The tadpoles feed by rasping the surface of plant stems and detritus while the aggregation moves through certain areas of the pool. The aggregation modifies its aquatic environment by agitation and increasing the temperature. The survival value of this behavior in the freshwater community is discussed.

VAZ-FERREIRA, RAUL, LUCRECIA COVELO DE ZOLESSI and FEDERICO ACHAVAL (Facultad de Humanidades y Ciencias, Montevideo, Uruguay). Oviposition and development of snakes and lizards in anthills of Acromyrmex, II.

A previous contribution on this subject is complemented by additional information on new collections, and on characteristics of the eggs and hatchlings of the snakes and lizards that utilize anthills of Acromyrmex as incubation chambers. The authors list new localities and situations in anthills for Philodryas patagoniensis (Girard), Liophis obtusus (Cope), Micrurus frontalis altirostris (Cope), Pseudablabes agassizi (Jan), Clelia rustica (Cope), and Teius teyou (Daudin), and note other species with this same behavior. The behavior of hatchlings is described, and further information is presented on the ecological character of the fungus chambers of Acromyrmex.



CONSERVATION PAGE: TURTLES CATCH IT FROM SEVERAL DIRECTIONS

Arising from concern over the decrease in the numbers of amphibians and reptiles in Britain, the BRITISH HERPETOLOGICAL SOCIETY has set up a Conservation Committee. This committee will bring together as much information as possible on the important remaining habitats for amphibians and reptiles in Britain. Every effort can then be made to protect as many as possible of these sites to ensure the survival of these interesting groups of animals.

This work will be carried out in cooperation with the Nature Conservancy and County Conservation or Naturalists' Trusts. The committee will also be pleased to give advice to interested parties on any matter relating to conservation of amphibians and reptiles. Anyone interested and prepared to help the committee in its work should get in touch with the Chairman: Mr. M. R. K. Lambert, the British Herpetological Society, c/o Zoological Society of London, Regent's Park, London, NW1 4RY. (From HABITAT 7(6)).

Turtles in Soup Over Salmonella

Pet Turtles Will Be Banned in N.J.

INTERNATIONAL TURTLE & TORTOISE SOCIETY, Inc.
8847 DE HAVILAND AVENUE • LOS ANGELES, CALIFORNIA 90045 • P.O. BOX 45555 • PHONES: FR 5-0873 • 645-7351

MEMBERS: Send in Salmonella Reports!

SUBJECT: Our Privilege to Keep Pets!

The case of turtles and *Salmonella* infection continues to make headlines and news notes. I.T.T.S. staff is seeking authentic reports and studies on this controversial issue.

We feel that turtles are being unjustly singled out as sources of this rarely-fatal infection. The case against them continues to be made – based on the findings of tests on scattered specimens – seemingly on the premise that: "Well, your parrot doesn't seem to carry *Salmonella*, so it must be from your turtle." (This was reported to the editors by a member who had an ear infection. There was no attempt to test either bird or turtle!)

If we value our right and privilege to keep pets, we must sort out fact from fiction and hearsay, truth from untruth or surmises on this question. Admittedly, improperly kept and cared for turtles may be a source, but documentation also includes as sources: cats, dogs, birds, swine, fish, lizards, insects, rats, mice, chameleons; meats, candy bars, eggs, powdered dry milk, deviled egg-and-shrimp (sandwich combination), animal by-products used in animal foods, and fertilizers. Food-slicing machines and unwashed human hands have also been known to be carriers.

The state of Washington now bans turtles until they have favorably passed examination. Why are not all other members of the animal kingdom so tested?

Today: Washington! Tomorrow: the world? Let's not sit idly by until it is too late and another personal freedom is made the subject of unwieldy and unjustified legislation!

Sincerely yours,

The Editors

Oil of the Turtle
potent dry-skin help in a whippy-pink aerosol. $6.
At the finest stores in America
Oil of the Turtle Ltd., Polly Bergen, President
9255 Sunset Boulevard, Los Angeles, California 90069

Medifacts

New developments in medicine that may affect your health

TURTLE-BORNE SALMONELLA Hartford, Connecticut, epidemiologist Dr. Steven H. Lamm has just completed a study, reported in *Medical World News*, that shows that pet turtles are a far more frequent cause of salmonella infections than was formerly supposed. In fact, if Connecticut is representative of the rest of the country, about one fifth of an estimated two million salmonella infections each year are contracted from turtles.

After detailed investigation of illness in sixty-six families implicated turtles in 27 percent of the cases, Dr. Lamm undertook a field investigation of the source of the bacteria. He and Mr. Arthur Bruce of the state laboratory made cultures from the turtle tanks of all eighteen pet stores in Bridgeport, Meriden and Bristol and found that every one contained salmonella. However, the pet dealers themselves were not at fault. Further study proved that the turtles were already contaminated when they were received from the supplier; and a visit to one supplier, a turtle farm in Louisiana, showed conclusively that poor conditions there were the original source of infection. As a solution, Dr. Lamm proposes Federal regulation of commerce in turtles. In the meantime, parents would do well to remember that turtles are not necessarily the cheap, simple pet they seem to be. In eight of the Connecticut cases, the disease they carried was severe enough to require an average of eleven days hospitalization at a cost of $1,200 per child. (WOMEN'S DAY, September 1971)

RADIATED TORTOISE OWNERS.
A group of concerned collectors is taking a census of all Geochelone radiata in the country for the purpose of exchanging ideas on the care, feeding, and captive reproduction of the species. Possibility of a periodic newsletter being started to keep all owners abreast of new developments and ideas for captive breeding, etc. Your cooperation is urgently needed. If you own a radiated or know someone who does, please contact: William H. Zovickian, 1200 Burnham St., Colorado Springs CO 80906.

TURTLES ON THE MOVE.
California Fish and Game has authorized the California Turtle & Tortoise Club to relocate 30 or 35 tortoises (Gopherus agassizii) from California City to the Lancaster area.

CONSERVATION CREDO.
Dreamed up by wildlife lovers and campers: "Take nothing but pictures, leave nothing but footprints." (From TORTUGA GAZETTE 7(9):4.)

REGIONAL SOCIETIES PAGE

NEW SPONSOR FOR ENGELHARDTIA.
Engelhardtia is now published by the Long Island Naturalist Society. Prior to 25 March 1971, this group was known as the Long Island Herpetological and Ornithological Society. The journal (my last issue is vol. 4 no. 2) increasingly reflects the group's devotion to the natural history of Long Island and nearby regions. Its pages also contain notes on the field trips sponsored by the society. Meetings are held at the Nassau County Museum of Natural History (Seaford, Long Island).
For an additional $4.00 one can join the JAMAICA BAY CHAPTER of the Long Island Naturalist Society in the region of New York City.

BOB DUBOS (past treasurer of Connecticut Herpetological Society) is a member of the scientific study team in the Aleutian Islands.

SUE SLATE (U. Conn.) has begun a definitive search for reptiles and amphibians in Litchfield Co., Conn.

EASTERN SEABOARD HERPETOLOGICAL SOCIETIES.
Staten Island Zoo, on October 9th, will be the scene of the combined meeting.

NEW SOCIETY IN INDIANA.
Indiana Herpetological Society (c/o Garry S. Bryan, 453 N. Grant St., Martinsville IN 46151) is being formed.

MASSACHUSSETTS (NEW ENGLAND AREA).
A new Turtle & Tortoise Society is starting here (John C. Stuart, 47 Garrison Rd., Brookline MA 02146). This will be primarily devoted to the protection and conservation of the turtles of that area.

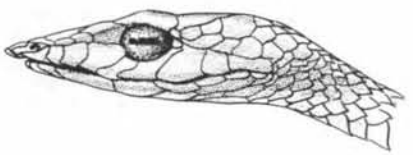
WELCOME: INLAND EMPIRE BRANCH.
The Southwestern Herpetologists Society has welcomed to its ranks a fourth branch, the Inland Empire, based near San Bernardino (c/o Dr. Joe Gorman, Dept. Biol., U. Redlands, Redlands CA). The group meets on the first Tuesday of each month, 7:30 p.m., at the San Bernardino County Museum, in Bloomington.

LODI CALIFORNIA AREA.
Get in touch with Mrs. Lillian Dickinson, 1507 W. Park St., Lodi CA 95240. She has just recently held a turtle/tortoise display at the Lodi library with the idea of getting interested people together to form a Turtle & Tortoise Club there.

OJAI CALIFORNIA AREA.
Here get in touch with Mrs. Lillian Greene, Rt. 3, 130 N. Lomita, Ojai CA 93023. She and a few more people in her area are looking for enough people to start a Turtle & Tortoise Club, too.

NEW JOURNAL

HISS just received the recent issues of NOTIZIARIO DELLA UNIONE ERPETOLOGICA ITALIANA, published by the Unione Erpetologica Italiana (Museo Civico di Zoologia, 00197 Roma, Via Ulisse Aldrovandi, 18 Italy). The 52 mimeographed pages of the 2 issues of Volume One contain articles by Silvio Bruno, Giuseppe Maria Carpaneto, Lucia Naviglio, Guy Naulleau and reports, reviews, meetings and lectures, Italian herpetological literature and conservation. The cartoon and illustrations were drawn by Stefano Maugeri. Membership dues for 1971 include the journal subscription. Regular L.1500, Student L.1000, Supporting L.5000.



ANOTHER SOCIETY?

It was a pleasant surprise to receive the first issue of BULLETIN DE LIAISON DU GROUPE DE TRAVAIL SUR LES AMPHIBIENS D'AFRIQUE. In addition to Arne Schiotz "Preliminary report on a collecting tour to East Africa" it also contains a "List of herpetologists working on African Amphibia". Abstracts of the first meeting (27-29 Nov. 1969) are presented. Attending the meetings were A.G.C. Grandison (Britain), Mills Tandy (USA), G.F. de Witte and S. Orts (Belgium), F. Xavier, J. Guibe, L.P. Knoepffler, M. Lamotte (France), A. Schiotz (Denmark), J.L. Perret (Switzerland) and K. Klemmer (Germany).

GEOGRAPHIC DISTRIBUTION PAGE

We announced some time ago that HERPETOLOGICAL REVIEW would publish brief notices of new geographic records, in order to make these available to workers in published form. The STANDARD FORMAT for these records is:

SCIENTIFIC NAME. Locality; Date; Collector. Identified or verified by. Place of deposition and catalogue number. Comments. SUBMITTED BY, and address.

Please submit new locality records to: GEORGE R. ZUG, Division of Reptiles & Amphibians, National Museum of Natural History, Washington, DC 20560.

N E W R E C O R D S

AMBYSTOMA MACULATUM. U.S.A., Illinois, Adams Co., Keene Township, Section 23; 10 and 17 April 1971; D. J. Upchurch. J. D. Black. Herpetological collection of Northeast Missouri State College Department of Biology, no number. First record for west-central Illinois. Submitted by D. J. UPCHURCH, Northeast Missouri State College, Kirksville, MO 63501.

DEIROCHELYS RETICULARIA RETICULARIA. U.S.A., Mississippi, Lowndes Co., west bank of Tombigbee River, ca. 14 mi. SE of Columbus; 10 June 1970; J. Wilder. C. G. Jackson, Jr. & G. R. Zug. U.S. Natl. Museum 192730. First record for northeastern Mississippi. Submitted by C. G. JACKSON, Jr., Department of Biological Sciences, Mississippi State College (Women), Columbus, Mississippi 39701.

DERMOCHELYS CORIACEA. Brasil, Isla Sao Sebastiao; 1969; fisherman. P. Mueller. Skull and carapace in P. Mueller's collection. First known occurrence on the island. Submitted by P. MUELLER, Abt. Biogeographie, Geographisches Institut der Universitaet des Saarlandes, 66 Saarbruecken 11, WEST GERMANY.

HEMIDACTYLUS TURCICUS. U.S.A., Florida, Pinellas Co., St. Petersburg; 5 August 1971; Richard Magran. C. J. McCoy. Carnegie Mus. 54764-54765. Submitted by C. J. McCOY, Carnegie Museum, Pittsburgh, PA 15213.



RECENT PUBLICATIONS

TURTLES OF TAIWAN: A NATURAL HISTORY OF THE TURTLES, by Shou H. Mao. 1971. The Commercial Press, LTD. Taipei, Taiwan, Republic of China. 128 pp., illus.

THE SNAKES OF EUROPE, by J. W. Steward. 1971. David & Charles: Newton Abbot. 238 pp., illus. $6.05.

AMPHIBIANS AND REPTILES OF THE USSR, by A.G. Bannikov, I.S. Darevskii and A.K. Rustamov. 1971. "Mysl" Publ. House, Moscow. 304 pp., illus.

SERPENTS DU LAOS, by J. Deuve. 1970. O.R.S.T.O.M., Paris. 251 pp., illus.

LIVES OF BRITISH LIZARDS, by Colin Simms. 1970. Goose & Son Publ., Norwich. 128 pp., illus. $6.05.

TURTLES OF THE NORTHEASTERN UNITED STATES, by Harold L. Babcock. 1971. Dover Publ. Inc., New York. 108 pp., illus. $2.50. (reprint).

RED DATA BOOK. VOLUME 3 - AMPHIBIA & REPTILIA, compiled by Rene E. Honegger. 1968. IUCN, Morges, Switzerland.

CIENCIA Y FANTASIA SOBRE LAS SERPENTES DE VENEZUELA, by Janis A. Roze. 1970. Fondo de Cultura Cientifica, Caracas. 162 pp., figs. (some color).

INTRODUCTION TO HERPETOLOGY, second edition, by Coleman J. Goin and Olive B. Goin. 1971. W. H. Freeman and Co., San Francisco. 353 pp., illus.

THE SYSTEMATIC BIOLOGY COLLECTIONS OF THE UNITED STATES: AN ESSENTIAL RESOURCE. Part I. The Great Collections: Their Nature, Importance, Condition, and Future, by William C. Steere (Chairman), Committee on Resources and Needs of the Major Systematic Biology Collections of the United States. 1971. 33 pp.

CAMP'S CLASSIFICATION OF THE LIZARDS, with a preface by Charles L. Camp and an introduction by Garth Underwood. 1971. FACSIMILE REPRINT HERPETOL. xvii, 289-491.

C O R R I G E N D A

BEZY, R. L., & J. W. WRIGHT, 1971KVR, HERPETOL REV 3(4): 71-72:

P. 71, 1st col., 2nd para., line 13: "(LACM 63584-91)" SHOULD READ "(LACM 64584-91)."

P. 72, 1st col., 3rd para., line 18: "2N...20 micros" SHOULD READ "2N...10 micros"



ALBUQUERQUE MEETING
AUGUST 1971

ROW 1. Kraig Adler, J.T. Collins, Ronn Altig, Elinor S. Benes, Jack McCoy, Lynne Kour, Bob Gordon, T. Paul Maslin, James R. Dixon, Wilmer W. Tanner, Madge Minton, Sherman Minton. ROW 2. M.J. Fouquette, George R. Pisani, Raymond Leclair, Diana Weigmann, Marcel Bruneau, Douglas H. Taylor, Ronald A. Brandon, Hobart F. Landreth, Jeffrey L. Briggs, James L. Christiansen, Ken Larsen. ROW 3. Chuck Lowe (alias Jay Savage), James L. Vial, Jerry Glidewell, Michael A. Williamson, Ronald Gratz, William S. Parker, Max A. Nickerson, Max Hensley, Victor Hutchison, Charles Mueller, Thomas H. Fritts, Warren P. Porter, Robert R. Beatson. ROW 4. David M. Dennis, David H. Snyder, Donald Harker, Frederick Wagner, Richard D. Worthington, James C. Kroll, Robert R. Fleet, Robert G. Webb, Arden H. Brame, Jr., G. Ann Leviton, A. Leviton, C. Richard Tracy, Richard C. Vogt, Diane M. Secoy, I. Gilboa, John Minnich. ROW 5. Thomas Berger, David Gillette, Cal Welbourn, Bill Carter, John Applegarth, Charles T. Everett, Carl S. Lieb, Donald E. Hahn, J.B. Murphy, Wayne Seifert, H.K. Gloyd, Michael W. Enochs, David L. Hardy, Daniel M. Watson. ROW 6. R.D. Aldridge, James Campbell, Dane Vleck, Bayard Brattstrom, Wesley Lagerberg, H.G. Dowling, Mabel Turner, Fred Turner, Bob Bezy, Phil Regal, Carl Gans, Mickey Bogert, Charles M. Bogert, William E. Duellman, Leslie D. White, Donald R. Clark, Jr. ROW 7. Ian Straughan, John Wright, Tim Kaspar, Bob Thomas, Pat Conley, Edward H. Taylor, Philip A. Medica, Mike Seidel, Marge Seidel, John L. Behler, Robert J. Werth, John W. Ferner, Gus Engbretson, Stephen Edwards, Harry Greene, W.G. Degenhardt, Steve Williams.

CURRENT HERPETOLOGICAL TITLES, XVII: 1970 - 1971

Herpetological Information Search Systems
American Museum of Natural History
New York, New York 10024

We have brought to your attention more than 13,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1970-1971) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be even more current. We hope that the added numbers will serve to reduce the titles-per-issue to a more manageable number.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 22 May through 16 July 1971. Periodical title abbreviations follow the American Standard for Periodical Title Abbreviations Z 39.5-1963 (American National Standards Institute, Inc., New York).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and L. Greene. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. The library staff of the Museum have continued to aid our project. Special thanks to the members of the Herpetology Department, AMNH for their aid in cross indexing, which allows us to offer new services. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

No commercial computer service yet offers all of the facilities that we need and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 35 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

*H*ERPETOLOGICAL
*I*NFORMATION
*S*EARCH
*S*YSTEMS



NEW H I S S SERVICE

BESIDES the "Current Herpetological Titles" section that appears regularly in HERPETOLOGICAL REVIEW, for some years HISS has been producing these same titles on sets of library cards for about ten institutions. These have appeared quarterly, and are arranged alphabetically by author.

Beginning in 1972, HISS will amplify this service by providing four differently-arranged card decks, and by supplying them in two different formats (about 1,000 cards per quarter):

DECK 1. Arranged alphabetically by AUTHOR; 25-35% with abstracts.
DECK 2. Arranged by SUBJECT (e.g., ecology; embryology; physiology; taxonomy); sorted to the smallest inclusive term.
DECK 3. Arranged by TAXON (e.g., Rana; Reptilia; Hylidae); sorted to the smallest inclusive taxon (to species).
DECK 4. Arranged by GEOGRAPHY (e.g., Ghana; Alabama; Oriental Region); sorted to the smallest inclusive term (to country or state).

As indicated, about 30% of the cards in Deck 1 will have abstracts. In addition, all of the cards will bear a code-line that indicates its allocation in all three categories: subject, taxonomy, and geography.

All of the above will be produced on Library of Congress stock, punched and cut to standard library (approximately 3x5") dimensions.

They also will be produced on pages of 90-pound ledger stock, un-punched and uncut, but marked for cutting. This method of production reduces the cost to about half -- thus bringing the cost of an entire deck to within the price-range of an interested individual.

Furthermore, we will sell parts of the indexed decks (90-pound stock) at a fraction of the cost of the entire bibliography. By selecting a restricted area of interest (e.g., anatomy; Plethodon; Texas), an individual can receive quarterly notice of papers in his field some 10 to 30 months before such notice would appear in BIOLOGICAL ABSTRACTS or ZOOLOGICAL RECORD ("Amphibia" or "Reptilia" not accepted).

ANNUAL SUBSCRIPTIONS ARE:

	INDIVIDUALS	INSTITUTIONS
AREA ALERTING SERVICE:*		
First subject-area.....	$25.00	$50.00
Additional subject-areas (each)**.....	20.00	40.00
ANNUAL BIBLIOGRAPHY OF HERPETOLOGY		
On Library of Congress stock, cut & punched		
Deck 1.....	150.00	250.00
Decks 2-4.....	100.00	200.00
On 90-pound pages of ledger stock, marked for cutting (per deck).	75.00	150.00

* Retrospective searches (1758-present) cost about ten times the annual rate.
** Because all codes are hierarchial, the terms for any broad unit also includes any more restricted terms within it (e.g., Ethiopian region includes references to Kenya; Caudata includes Triturus).

-- 1970 --

- A -

ADAMO,NORMA JEAN
1970. Ciliated neurons in the hyperstriatum of chickens and hippocampus of frogs.
ANAT REC 166(2):269 (abstr).

ALHO,CLEBER J.R.
1970. Frequency of infestation by Strongyluris freitasi Alho, 1969 in Tropidurus torquatus (Wied).
REV BRASIL BIOL 30(4):539-542, 1 fig., 2 tab.

ALLEN,CHARLES
1970. How to call 'em when you see 'em.
HERPETOLOGY 4(3):3-4.

ALLEN,CHARLES
1970. The mouse house.
HERPETOLOGY 4(3):9-11, 1 fig.

ALONSO,M. and A.FRAILE
1970. Survival of xenoplastic transplants by semicarbazide in Anura.
REV ESPAN FISIOL 26(4):331-334 (Span, Engl summ).

ANDERSEN,NIKAAN B.
1970. The effect of thiopental and catecholamines on the sodium fluxes in toad bladder.
J PHARMACOL EXP THER 173(2):308-316, 6 fig., 5 tab.

ANDRES,G. and E.ROESSLER
1970. Uebertragung von artspezifischen Verhaltenskomponenten durch xenoplastische Transplantation von Gehirnanlagen zwischen Xenopus laevis und Hymenochirus boettgeri (Amphibia, Anura).
REV SUISSE ZOOL 77(4):959-962.

AUSTRALIAN NEWS AND INFORMATION BUREAU
1970. Photo of Amphibolurus barbatus (baardhagedis) in dreighouding.
LACERTA 28(10-11):cover.

AUSTRALIAN NEWS AND INFORMATION BUREAU
1970. Photo of Chlamydosaurus kingii.
LACERTA 29(2):cover.

ANON
1970. Mabuya macularia.
LACERTA 28(8):58.

ANON
1970. Mexican Ridley turtle decline.
KINGFISHER 5(5):8.

ANON
1970. Een nieuw soort voedsel voor huiskrekels.
LACERTA 29(3):34 (Engl summ).

ANON
1970. Photo of Phelsuma lineata chloroscelis.
LACERTA 28(4):cover.

ANON
1970. Snakes of the world exhibit - 1970.
SNAKE 2(2):135-137, 5 fig.

ANON
1970. U S live wildlife imports.
KINGFISHER 5(5):7.

ATAEV,CH.
1970. Materials on the ecology of skinks in Kopet-Dag, pp. 144-149, 1 fig., 2 tab., In G.P. Dement'ev (Ed.), The animal world of Turkmenistan (Terrestial Vertebrates). Acad. of Sci. of Turkmenistan S.S.R. "Ylym" Publishing House, Ashkhabad.

AUBRY,J.C. and J.M.POSTERNAK
1970. Influence de la temperature sur l'anesthesie differentielle des fibres A alpha sensorielles et motrices de la grenouille.
ARCH INT PHARMACODYN THER 186(2):227-242, 5 fig., 3 tab. (Engl summ).

- B -

BADEN,H.P. and P.F.A.MADERSON
1970. Morphological and biophysical identification of fibrous proteins in the amniote epidermis.
J EXP ZOOL 174(2):225-232, 9 fig., 2 tab.

BAIRD,I.L.
1970. A preliminary report on light and electron microscopic studies of a crocodilian basilar papilla.
ANAT REC 166(2):274 (abstr).

BALDWIN,WILLIAM M.,III and NICHOLAS COHEN
1970. Liver-induced immunosuppression of allograft immunity in Urodele amphibians.
TRANSPLANTATION 10(6):530-537, 3 fig., 3 tab.

BANERJEE,S.K. and U.PAHARI
1970. Observations on the hypothalamo-neurohypophyseal system in the starved garden lizard: Calotes versicolor.
SCI CULT 36(11):606-608, 3 fig., 1 tab.

BELOFF-CHAIN,ANNE and K.A.ROOKLEDGE
1970. A comparative study on the influence of temperature on the metabolism of glucose in isolated reptilian and mammalian muscle.
COMP BIOCHEM PHYSIOL 37:67-72, 3 tab.

BERRY,P.Y.
1970. The food of the giant toad Bufo asper.
ZOOL J LINN SOC 49:61-68, 2 fig., 3 tab.

BESKOV,V.
1970. Biologie und verbreitung des griechischen frosches (Rana graeca Blgr.) in Bulgarien. II. Untersuchungen ueber die Fortpflanzung und die Larven.
BULG ACAD NAUK IZV ZOOL INST 32:178-180.

BIBB,H.D.
1970. Ganglionic hypertrophy in Rana pipiens larvae.
ANAT REC 166(2):279 (abstr).

BILLIAU,F.
1970. Ervaringen met teju's en enige andere grote hagedissen.
LACERTA 29(2):15-16, 2 photos (Engl summ).

BISWAS,S.
1970. Proposal for the protection of marsh crocodile.
INDIAN FOREST 96(9):704.

BISWAS,S.
1970. A preliminary survey of Gharial in the Kosi River.
INDIAN FOREST 96(9):705-710, 1 tab., 1 map.

BOGDANOV,O.P.
1970. Birds as sources of food for reptiles, pp. 123-133, In G.P. Dement'ev (Ed.), The animal world of Turkmenistan (Terrestial Vertebrates). Acad. of Sci. of Turkmenistan S.S.R. "Ylym" Publishing House, Ashkhabad.

BONTA,I.L., K.DE VRIES-KRAGT, C.J.DE VOS and N.BHARGAVA
1970. Preventive effect of local heparin administration on microvascular pulmonary hemorrhages induced by cobra venom in mice.
EUR J PHARMACOL 13:97-102, 3 fig., 1 tab.

BORYSENKO,M. and C.L.YNTEMA
1970. Fate of limb allografts and xenografts transplanted in turtle embryos.
ANAT REC 166(2):281 (abstr).

BOUIX,GEORGES and ROBERT BOURGAT
1970. Cycle spermatogenetique de Chamaeleo pardalis Cuv., de l'ile de la Reunion.
ANN FAC SCI UNIV MADAGASCAR (7):307-315, 1 tab., 3 pl. (Engl summ).

BOURLIERE,F.
1970. (Review of) The tailed amphibians of Europe, by J. W. Steward, 1969.
TERRE VIE 117(4):637.

BROWN,ELDON R., JOHN WM.HABERMAN and JACK K.KAPPEL
1970. Productive collecting sites for Sistrurus catenatus edwardsi/tergeminus in southeast Colorado.
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UNREVIEWED-UNEDITED COMMUNICATIONS

HEMIPENIAL MORPHOLOGY OF THE TREE LIZARD, PLICA PLICA (LINNAEUS)

H.G. Dowling, T.C. Majupuria, & F.W. Gibson

The structure of the male genitalia of lizards has been little studied and its possible taxonomic significance has not yet been assayed. Cope (1896) was the first to survey the variation in hemipenial structure. He suggested that it had considerable taxonomic importance, but he only briefly described the hemipenes of a few representative species of lizards from several families, and did not follow up the results of this preliminary survey. Uzzell in his work on microteiids (1965, et seq.) is the only recent worker to utilize hemipenial descriptions as a major feature of his generic definitions.

The thin-walled structure of most lizard hemipenes and their small size (as compared with those of snakes) discourages their study as inverted organs. Their features of ornamentation consist mainly of calyces, flounces, ridges, and "welts," which must be inflated in the everted organ to be properly observed. However, in spite of Smith's (1946: 14) statement to the contrary, spinose hemipenes are found in some species (Uzzell, 1965: 82). However, the spines are small and inconspicuous in most and have been found to be only of seasonal appearance in Lacerta (Boehme, 1971). The apparent length of the organ in Sceloporus has been found to vary seasonally as well (Altland, 1943) and the absence of regularly-arranged subcaudal scutes in lizards makes size-comparisons between different genera difficult.

In spite of these difficulties of study, we believe that the hemipenes may give important information on the taxonomic relations of lizards, and look on this as the first of a series of papers in which we will investigate the value of hemipenial structure as a taxonomic character in the Sauria.

Aside from Cope's (1896) basic work, there are descriptions of the hemipenial structure of individual species from several workers. Among these are descriptions of Lacerta (Woepke, 1931), Hemidactylus, Calotes, Chamaeleon, and Mabuya (McCann, 1946), Uromastix hardwickii (Das, 1960), Anguis (Raynaud and Pieau, 1969), Brookesia (Brygoo & Domergue, 1969), and further studies on Uromastix hardwickii (Majupuria, 1969, 1970). Among these only McCann, and Brygoo and Domergue, attempted to attach taxonomic importance to the hemipenial structures described.

Attempts to correlate information on hemipenial structure also suffer from the lack of an adequate system of standardized terminology for use in the description of these organs. We hope to develop a system in the progress of these studies, which will be comparable to that for snakes that was given by Dowling and Savage (1960).

Cope (1896) gave brief descriptions of the hemipenis in a few species of iguanid lizards, but aside from some general remarks by a few other workers, the Family Iguanidae appears to have escaped study. Because this is a large and complex American family, with many specimens readily available, it appears to be an ideal base from which to initiate a comparative study of lizard hemipenes. The hemipenis of the well-known Neotropical tree lizard Plica plica is described here. Future studies will investigate intrageneric variation in polytypic genera, intergeneric variation, and test the reality of apparent familial characters of this organ.

THE HEMIPENIS OF PLICA PLICA

The following description is derived from the study of two pairs of hemipenes: both everted in one individual (HGD-796; Trinidad), the right everted and the left inverted in the other (AMNH 107590; Peru).

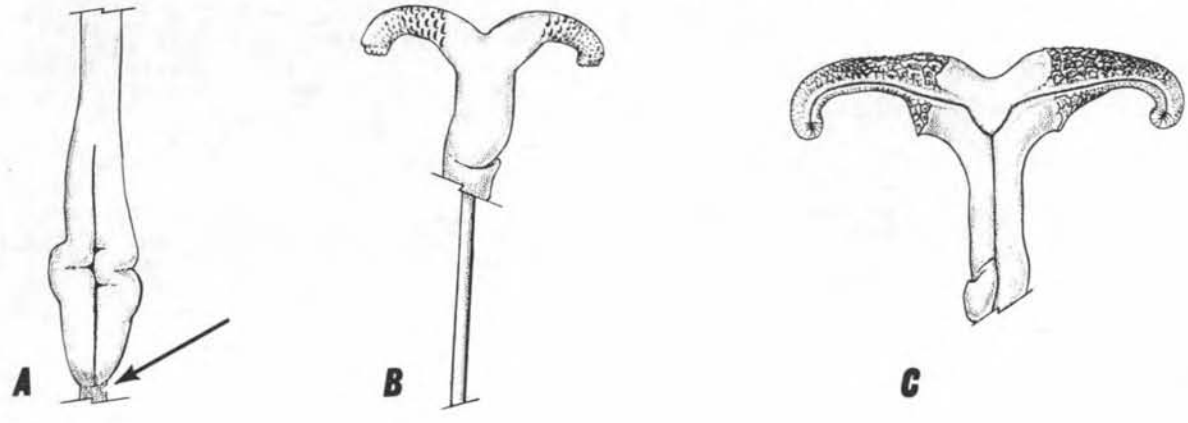


FIG. 1. Hemipenis of Plica plica: A. Inverted organ, showing attachment of muscle retractor penis (arrow) and slight compression of lobes in situ. B. Asulcate (= lateral) view of hemipenis, showing restriction of calyculate areas to apical lobes, basal fold, and the length of m. retractor penis (which originates on the fifth caudal vertebra) when organ is everted. C. Sulcate (= medial) view, showing course of sulcus spermaticus and distribution of calyculate areas.

Both preparations were done from fresh material. The latter specimen is an adult male with a snout-vent length of 105 mm (total length, 193 mm).

The hemipenis (AMNH 107590) has a total length of 15 mm in both inverted and everted conditions. In the inverted condition it lies under the feebly-developed muscle vaginalis penis, but toward the lateral edges of the tail. It is covered by an outer sheath which is almost transparent. A small medial slit in the sheath exposes the hemipenis and shows that the apical lobes in the inverted condition are situated distally with little compression (Fig. 1A). The muscle retractor penis originates on the fifth caudal vertebra. It passes forward between the ischiocaudalis and caudoilliofemoralis muscles, and inserts in two rami at the tips of the lobes.

The everted specimens (Fig. 1B) show the organ to be deeply bilobate, with each of the lobes being nearly the length of the subcylindrical basal stalk. An apparent difference in the length of the two lobes may be an artifact of preparation.

The sulcus spermaticus originates near the opening of the ductus deferens at a small depression in the upper wall of the cloaca. It extends through the cloacal aperture and along the basal pedicil of the hemipenis to near the level of the lobes. It bifurcates at this point and extends out on the medial side of the lobes to their apices (Fig. 1C). Its U-shaped channel probably is closed by the sulcus lips during copulation, thus serving as a tube to carry the semen from the urogenital opening in the cloaca of the male to near the oviducal opening in the cloaca of the female, without contamination from the excretory and fecal materials that also enter this region.

The pedicil of the hemipenis is smooth, without obvious ornamentation. There are two basal folds near its proximal end. The lobes are ornamented with reticulate patches of small, smooth-edged calyces, which extend from near the base of each branch to near the apex. These calyculate areas completely surround the apical lobes. Proximal to the calyculate areas, the bases of the lobes are relatively smooth.

The restriction of ornamentation to the apical lobes of the organ is notable, as is its presence completely around these lobes. Other features worthy of special note may appear with our continuing studies on the hemipenes of other lizards.

ACKNOWLEDGMENTS & ABBREVIATIONS

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Some of the specimens are in the private collection of H. G. Dowling (HGD).

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UNREVIEWED-UNEDITED COMMUNICATIONS

EFFECTS OF DIFFERENTIAL PRESERVATION ON DERMAL PUSTULARITY OF THE MICROHYLID FROGS GASTROPHRYNE AND HYPOPACHUS

Craig E. Nelson

The extent of dermal pustularity in various North American microhylid frogs has occasionally been used as a taxonomic character (Dumeril and Bibron, 1841; Strecker, 1908; Stuart, 1963; and others). In a recent example, Stuart (1963), used the degree of pustularity as a principal character in separating some Guatemalan species of Hypopachus, contrasting them: "skin smooth though often covered with tiny spicules," "pustules frequently restricted to the posterior part of dorsum or confined to upper surface of thighs," and "dorsum and upper surface of thighs very pustular."

Although the extent of pustularity varies between live individuals within the same population for at least some species of North American microhylids (Burt, 1938, for G. olivacea and H. cuneus; Wright and Wright, 1949, for G. carolinensis; and personal observation for various species of Hypopachus), there are often distinct differences between series of both live and preserved microhylids in the extent of pustularity and its use as a taxonomic character in this group appeared well founded. However, Mertens (1952) reports a series of Hypopachus from a single locality in which one specimen was preserved apart from the bulk of the series and was subsequently observed to be distinctly more pustular than the others. He suggests that variations in preservative strength affect the pustularity of specimens of this genus. I have accidentally acquired data supporting Mertens' suggestion.

As a routine field procedure, I usually kill amphibians in a saturated aqueous solution of cloretone, inject them with 10 per cent formalin, harden them between layers of paper towels dampened with 10 per cent formalin, and fix them further in a jar of the same solution. In the course of interspecific hydridization, a few male microhylids were treated differently. These were killed by cutting through the back of the skull and the brain with a pair of scissors, the body cavity was opened and the testes were removed, and the carcasses were immersed in a jar of approximately 20 per cent formalin usually used for the preservation of specimens found dead on the road. In at least some cases, the carcasses showed considerable reflex action after immersion in the formalin. Specimens fixed by both procedures were subsequently stored temporarily in 10 per cent formalin, washed, and transferred for permanent storage to 50 per cent isopropanol. Several months later, when the specimens were studied, those which had been used in hybridization were almost all very pustular whereas almost all of those preserved by the standard procedure were smooth. In some cases, individuals corresponding to Stuart's most divergent classes (Fig. 1) were thus obtained from a series of specimens of one species collected from a single population. Specifically, a series of Gastrophryne usta from two closely adjacent localities near El Treinta, Guerrero, Mexico, and series of Hypopachus from 7.9 miles southwest of Las Cruces, Chiapas, Mexico, and 1.3 miles west of Duenas, Sacatepequez, Guatemala, showed this contrast (the specimens were deposited in the Texas Natural History Collection). Moreover, the routine procedure produced series of smooth frogs from populations which Stuart (1963) characterizes as uniformly very pustular.

The pustularity of specimens preserved by divers technique is thus not an appropriate taxonomic character in microhylines.

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FIGURE 1. Contrasting dermal pustularity in Hypopachus championi preserved by different techniques (see text). All four individuals are from 7.9 miles southwest of Las Cruces, Chiapas, Mexico (left to right, Texas Natur. Hist. Coll. 31612, 31613, 31604, 31605).

UNREVIEWED-UNEDITED COMMUNICATIONS

INFLUENCE OF TRAP COVER TYPE ON PITFALL TRAPPING OF LIZARDS

William S. Parker

One method of sampling lizard populations is with the use of pitfall traps described by Banta (1957), variations of which have been used in population studies of desert lizards (Jorgensen and Tanner, 1963; Bostic, 1965; Spoecker, 1967). Banta (1962) described some of the advantages and disadvantages encountered with these traps. However, the influence of trap cover type on lizard captures has not been examined.

Influence of trap cover type on lizard captures was tested using an alternating pattern of rock covers, masonite square covers, and no covers. A brief experiment with pitfall traps was conducted in August 1966 with 99 one-gallon cans at an area about one mile south of Guadalupe, Maricopa County, Arizona. Williams (1968) described the study area and methods followed.

Four lizard species were captured in sufficient numbers to permit Chi Square analysis (Table 1). All except Coleonyx variegatus were young-of-the-year. Using the 0.05 level of significance, captures of Cnemidophorus tigris were distributed in a non-random manner, with a majority in rock covered traps. No significant difference was indicated for the other three species, but captures of Uta stansburiana are suggestive of a difference in captures between covered and uncovered traps.

Although the pooled data indicate covered traps caught a significantly larger number of lizards, a test of heterogeneity implies that perhaps pooling data for the four species was not justifiable (Table 1). Each species probably responded in a different way to the three cover situations. Captures of Coleonyx and Uta show similarly greater numbers in covered traps, but those for Dipsosaurus exhibit a random distribution.

Although sample sizes were too small to permit firm conclusions on any of the species, the results indicate that a further study of this nature would be rewarding and that extreme care must be taken in using pitfall traps for lizard population studies. One cover type may be significantly more successful in capturing a particular lizard species, and consequently significantly influence the results obtained.

I am grateful to Stanley C. Williams who designed this study for scorpions and allowed me to use his traps, and to William S. Brown and Lionel G. Klikoff for comments on the manuscript.

TABLE 1. -- Influence of trap covers on lizard captures. Each trap type was represented by 33 traps.

	ON	EN	SS	DF	X^2	P
Coleonyx variegatus						
rock	4	3.3	10	2	2.63	0.30>P>0.20
masonite	5	3.3				
no cover	1	3.3				
Dipsosaurus dorsalis						
rock	2	3.0	9	2	0.67	0.80>P>0.70
masonite	4	3.0				
no cover	3	3.0				
Uta stansburiana						
rock	13	10.0	30	2	5.40	0.10>P>0.05
masonite	13	10.0				
no cover	4	10.0				
Cnemidophorus tigris						
rock	11	6.0	18	2	6.33	<0.05
masonite	3	6.0				
no cover	4	6.0				
Pooled						
rock	30	22.3	67	2	7.29	<0.05
masonite	25	22.3				
no cover	12	22.3				
Heterogeneity:				6	7.74	0.30>P>0.20

ON = observed numbers; EN = expected numbers; SS = sample size.

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UNREVIEWED-UNEDITED COMMUNICATIONS

THE TADPOLE OF RANA PILEATA

W. Ronald Heyer

During the Field Museum of Natural History Herpetological Expedition to Thailand in 1969, a number of tadpoles were collected at the Sakaerat Biological Station located 250 km NE of Bangkok. The collection forms the basis of a report on tadpole ecology (Heyer, in prep.). Certain species were collected for the first time as larvae and described (Heyer, 1971). Mr. Karl J. Frogner recently allowed me to examine a collection of larvae that he made at Sakaerat from June through August of 1968. In the Frogner collection, the larvae of Rana pileata represent a species not present in the 1969 collections and a species not previously described.

The purpose of this note is to describe the larva of Rana pileata, which will complete the descriptions of all larvae known from Sakaerat. The methods and style of description are the same as those used previously (Heyer, 1971). Specimens will be deposited at the Applied Scientific Research Corporation of Thailand, Bangkok, The Bernice P. Bishop Museum, Hawaii, and the Field Museum of Natural History, Chicago.

Description: Head and body oval; snout rounded; eyes dorsal; distance between nostrils about equal to interorbital distance; mouth subterminal; oral disk emarginate laterally, oral papillae in a single row laterally and ventrally, double ventrolaterally, interrupted anteriorly and posteriorly; denticle formula -----; beak well developed, serrate; spiracle sinistral, in the middle of the side of the body; anus dextral.

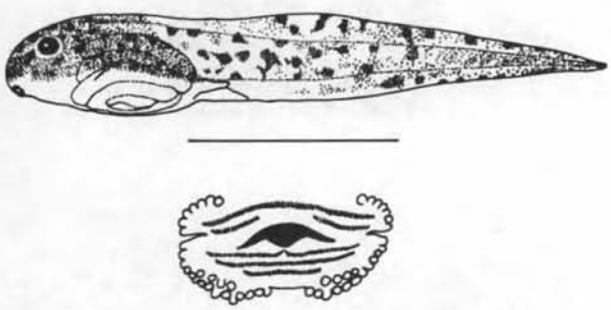


FIG. 1. Lateral view and mouthparts of tadpole of Rana pileata. Upper line equals 10 mm; lower line equals 1 mm.

Tail tapering to a point; dorsal fin beginning at end of body; greatest tail height usually less than body height.

Color pattern in preservative light brown flecked above, area around eyes lacking melanophores; no melanophores ventrally; tail spotted.

Eye moderately large, 9 to 13% head-body length; width of oral apparatus 17 to 21% head-body length; anterior papilla gap 50 to 67% oral apparatus width; head-body 32 to 38% total length; maximum total length recorded 38.9 mm at stage 40. (Fig. 1)

Ecological notes: Both adult and larval Rana pileata were collected along a seasonal stream, the Huai Pae, coursing through dry evergreen forest. Frogner (pers. comm.) collected the larvae from the bottoms of large pools in the stream bed. The pools were pond like in character, with little water movement through them. The larvae were lying on the bottom.

Relationships: Rana pileata belongs to a group of stream frogs whose larvae are not noticeably adapted for stream life, such as are those of the ranid genus Amolops. Larvae have been described for only three other species within this group: Rana blythii, R. kuhlii, and R. ibanorum (descriptions and figures of all three are in Inger, 1966). The dentition within the group seems unmodified, being a standard 2/3. With the three other known larvae, R. pileata shares the character of few, large oral papillae, which character, while not confined to larvae of this group, is not widespread throughout the genus. There is one character of oral apparatus morphology that supports Boulenger's (1920) species groupings. The known larvae of Boulenger's Grunnientes group have a posterior gap as well as an anterior gap in the oral papillae rows (R. blythii, ibanorum, pileata); while the known larva of the Kuhlianae group has but an anterior gap in the oral papillae (R. kuhlii). Rana pileata may be distinguished from blythii and ibanorum larvae by color pattern. R. pileata have large spots on the tail, R. ibanorum tails are not large-spotted; R. pileata do not have any melanophores ventrally around the mouth, R. blythii larvae have groups of melanophores sparsely grouped around the mouth.

ACKNOWLEDGMENTS

Karl J. Frogner (University of Chicago) kindly allowed me to examine his larval collection from Sakaerat and to prepare the description for Rana pileata. Robert F. Inger (Field Museum of Natural History) critically reviewed the note.

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UNREVIEWED-UNEDITED COMMUNICATIONS

ARBOREAL HABITS OF BUFO VALLICEPS AND OTHER BUFONIDS

Jaime Villa

Tree-climbing Bufo valliceps were reported by Neill and Grubb (1971) from Reed Park (Austin, Texas). They found several individuals in trees and treeholes up to 5 m above the ground, witnessed their climbing ability and finally suggested that human disturbance in the area of study and "rapid seasonal changes in population size and composition in Reed Park" may help explain "this unusual phoenomenon".

In January 1966, during a 10-day stay in Great Corn Island, Caribbean Nicaragua, J. A. Roze, E. B. Seligmann, R. G. Zweifel, and myself observed that during the day many individuals of B. valliceps retreated into tree-holes, on branches, palm axils, and under abandoned termite nests up to 2.5 m above the ground. Although the island has its share of habitat disturbance, due to rather primitive coconut harvesting (which in this case provides the abundance of coconut husks toads use as shelters), most of the individuals found on trees were in the "mountainous" parts of the island where coconut harvesting is negligible.

In a second visit to the island on June 1969, well into the rainy season, several more B. valliceps were found in trees, although they seemed to be concentrated around breeding pools. Possible seasonal changes in size and composition of Corn Island B. valliceps remain to be detected.

In San Juan del Norte (Departamento de Rio San Juan), a Nicaraguan mainland locality, B. valliceps was not especially abundant in March 1971. Not more than two dozen individuals were seen in one night. Two adult B. valliceps were found 3 m above the ground among epiphytic vegetation. The area seemed notoriously undisturbed.

These observations suggest that arboreal habits in B. valliceps are (at least in the tropics) more common and widespread than previously thought and that they are not necessarily correlated with habitat destruction. Arboreal habits in Neotropical Bufo are not, in fact, restricted to B. valliceps. I have found B. luetkenii, a species apparently related to and often difficult to distinguish from B. valliceps, in trees in several undisturbed localities in Esteli, Managua, Somotillo, and Tipitapa (Nicaragua). Finally, Noble (1918) after collecting in eastern Nicaraguan localities (Maselina Creek, Kanawa and Cupitna Camp, Dept. of Zelaya), which seem as undisturbed today as they were 55 years ago, reported finding B. coniferus in three main habitats, one of which was "Moss-covered vine about five feet from the surface of the water in a forest swamp".

I am indebted to Mssrs. Neill and Grubb for critical reading of this note and further comments on their paper.

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CAN ANYONE HELP?

OLIVIA BACA OSORIO (Seccion Biblioteca Central, Universidad Nacional Autonoma de Nicaragua, Managua, D. N., Nicaragua) would like to receive the JOURNAL OF HERPETOLOGY, beginning with Volume 1, Number 1. The Society has no provision for donations of this kind, but perhaps some individual would like to contribute in this way.

VACLOR PARIZEK (Hakena 18, Celakovice, Ok. Pha-vyehod, Czechoslovakia) would like to exchange a subscription to the quarterly journal ZOOLOGICKE LISTY (Folia Zoologica), for a HERPETOLOGICA subscription (some of the ZL articles are in English, others in German). Anyone interested?

UNREVIEWED-UNEDITED COMMUNICATIONS

BEHAVIOR OF LIZARDS IN AN ARTIFICIAL SHADE MOSAIC

Kenneth K. Asplund

ABSTRACT: Behavior of whiptail lizards (Teiidae, Cnemidophorus) in an artificial mosaic of shade shows that lizards of relatively larger body size confine thermoregulatory cooling to larger pieces of shade than do smaller lizards. It seems that smaller lizards may, when thermally motivated, respond differently to visual cues, relative to larger lizards, during use of an environmental thermal mosaic.

Many closely related species of bisexual whiptail lizards (Teiidae, Cnemidophorus) inhabit the Sonoran Desert and adjacent regions. The larger forms are often restricted to the shadiest habitats (C. maximus in thorn scrub; C. burti stictogrammus in riparian canyons and foothills of middle elevation); related smaller forms are frequently common in open desert scrub and desert grassland communities (C. tigris; C. burti xanthonotus).

There may be several selective advantages of small body size in desert habitats. They relate generally to the relatively greater capability of smaller lizards to effect thermal exchange with the environment. Smaller lizards can have relatively earlier seasonal periods of activity; during cool periods they maintain their elevated eccritic temperatures more effectively than do larger lizards (Cowles, 1941). During hotter times of day and of the year, smaller lizards may cool more rapidly following exposure to high temperatues (Cole, 1943).

In arid habitats like subtropical deserts, diurnal reptiles are ordinarily restricted to the vicinity of shade, in part as a function of body size. Supposedly the smaller species can find shade, where larger species cannot, in the canopy provided by scattered desert shrubs (Cowles and Bogert, 1944).

This relationship has not been experimentally analyzed in terms of behavioral factors: do learning, thermal cues, and/or visual cues affect the orientation and distribution of lizards in a thermal mosaic as a function of body size? A preliminary evaluation of these factors has been provided by observation of the behavior of lizards placed in an outdoor, artificial mosaic of shade.

This work was part of a doctorate dissertation at the University of California at Los Angeles (University Microfilms No. 68-16, 509), supported in part by a traineeship in environmental science from the National Aeronautics and Space Administration and by a grant to the Department of Zoology at UCLA (NSF GB 3871).

MATERIALS AND METHODS

Whiptail lizards of the tigris species group (C. tigris and C. maximus) were collected in the field and purchased in healthy condition from animal suppliers. They were housed in large indoor cages with 150-watt heat lamps. Lights were on for 12 hours each day, beginning at 8:00 AM. Retreats, mealworms, and water were provided.

An outdoor enclosure measuring 3 X 3 X 0.6 meters high was built at the Philip Boyd Desert Research Station near Palm Springs, Riverside County, California. The walls of the enclosure were made of colorless, transparent acetate, 0.025 inches thick, supported by stakes (3/4" pipe) and taped to rope tied between the tops of the stakes.

Inside the enclosure were placed 24 pieces of gray cardboard supported 5 cm from the ground with wire legs. Eight pieces measured 20 cm in diameter; 16 pieces, 10 cm in diameter. Thus the total of the circumferences (or diameters) of all small pieces equalled that of all large pieces; the probability that a moving lizard would intersect a small shade would be equal to that of intersecting a large shade. These cardboard canopies, two small ones between two large ones, were spaced equidistantly from one another at 8-10 cm from the wall.

Ten small lizards (5-8 cm snout-vent) were observed during activity in the enclosure. These small lizards could fit under the small cardboards without coiling. Two were juveniles of C. maximus; 8 were juveniles of C. tigris.

Eight large lizards of C. maximus (11-13 cm snout-vent) were observed similarly. These could not fit under the small cardboards unless they coiled. All could fit under the large cardboards without coiling.

On each of 10 days of observations 2-4 lizards of one size-class were introduced into the enclosure when the soil surface temperatures approached 30 C in the morning. After basking behavior became relatively uncommon, I counted the times that the lizards stopped under each size-class of shade. "Stopping" was defined as a cessation of walking lasting 15 seconds or more that did not include browsing (a lizard might enter shade for feeding rather than for thermoregulatory cooling).

Surface temperatures in the shades were taken during the observations, and correlated with the behavioral changes of the lizards.

RESULTS

LARGE WHIPTAILS. - After the initial basking period the large C. maximus began wandering along the walls of the enclosure for varying amounts of time. Lizards encountered both large and small shades in this initial exploratory period; none stopped in them.

Adults did not orient to the shade for thermoregulatory cooling until they were trained to associate the cardboard structures with the surfaces where they could cool. Lizards showed signs of thermal stress without entering shade. Thermal stress (exceeding the voluntary thermal maximum) was indicated by gaping, relatively agitated locomotion, and kinetic discoordination. Associated cloacal temperatures were 43-44 C.

Once in thermal stress, a lizard was placed in the shade so that it might learn that the cardboard canopies provided cool substrata. Each lizard was introduced to both small and large pieces of shade to reduce any training toward one size of shade. Lizards usually did not stop voluntarily in small shade, even when it was the first shade the lizard encountered.

During the first re-entry into the sun, three individuals became overheated a second time, and accordingly were introduced by hand again into the shade. No lizard overheated following 1-2 trials; each then regularly used the artificial canopies provided.

Large lizards would remain in shade for as long as 10 minutes or more, if left undisturbed. To increase the number of times a lizard stopped in shade, I would remove it from the shade after 1-3 minutes of cooling and place it in the center of the enclosure, from where it would ordinarily retreat to shade again.

The 8 large whiptails voluntarily stopped in shade 107 times. Small shade was used 4 times; large shade, 103 times ($P < .001$; Chi-square). See Table 1.

Lizards began to abandon or reject the available shade when the

TABLE 1. Use of shades of different sizes by lizards of 11-13 cm snout-vent length and of 5-8 cm snout-vent length.

	Large Lizards		Small Lizards	
Diameter of shade	20 cm	10 cm	20 cm	10 cm
Number of times selected	103	4	80	71
P (null of 1:1)	.001		.50 P .75	

surface temperatures of the shaded surfaces exceeded 41-42 C. Lizards were then in agitated states of activity; cloacal temperatures were 43-44 C. Under this environmental heat load, lizards would have to retreat underground to avoid heating above their voluntary thermal maximum.

SMALL WHIPTAILS. - The juvenile lizards regarded the pieces of cardboard as potential cooling sites throughout the experiments. None ever entered thermal stress, using behavioral criteria, and none required "training" in order to find the shade.

Juveniles did not remain in the shade longer than 2-3 minutes; they were not removed periodically from the shade in order to increase the number of choices they made.

The total of 10 small lizards stopped in shade 151 times: in large shade, 80 times; in small shade, 71 times ($.50 < P < .75$; Chi-square). There is thus no evidence that small lizards were biased in their utilization of shade. See Table 1.

Small lizards also abandoned shade once the surface temperatures in the shade exceeded about 41 C. Small pieces of shade were the first to exceed these temperatures over their entire profile, and were the first to be rejected.

DISCUSSION

Under the experimental conditions, larger lizards and smaller lizards partially segregated themselves according to the sizes of the pieces of shade. Larger lizards restricted their thermoregulatory cooling to larger cooling sites than did smaller lizards.

These data are consistent with field observations (Asplund, 1968; Duellman, 1965; Duellman and Zweifel, 1962; Zweifel, 1960) that smaller species of whiptails are often distributed in more open habitats or microhabitats than are larger whiptails, and that smaller individuals of a species occur more frequently than do adults in portions of the habitat having reduced canopies. Sympatric species pairs of Cnemidophorus ordinarily differ in body size. Such pairs might differ in physical niche as a consequence of size-related preferences for different thermal mosaics. Species of different body sizes might also differ in eccritic body temperatures, although the species and sizes used in this work appear to have the same thermal preferences, with a mean cloacal temperature of 40 C during locomotor activity (Asplund, 1968).

Results suggest that there are size-related (experience related ?) differences among whiptails regarding the visual cues that they readily associate with cooling sites. Smaller lizards did not require training to locate the shaded surfaces in the enclosure, whereas larger lizards did. The sight of a shaded surface, at least of the sizes used, can be an inadequate cue for larger whiptails. Work in progress should yield some insight as to what visual cues may be most meaningful to thermally motivated lizards.

In any given habitat, smaller lizards do have a greater number or variety of potential thermoregulatory sites than do larger lizards of the same species. It seems, accordingly, that smaller lizards might well respond to a greater variety of visual cues than might larger lizards.

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MEETINGS AND SOCIETIES

CALENDAR 1971

1-4 November....SOCIETY OF VERTEBRATE PALEONTOLOGY, Annual Meeting, Washington, D.C. (with GSA).

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Philadelphia (with AAAS; cosponsored by the SSAR).

CALENDAR 1972

June.....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Boston.

July.....SALAMANDER SYMPOSIUM, Highlands Biological Station, North Carolina.

August...Combined Meeting: HERPETOLOGISTS' LEAGUE AND SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, University of Oklahoma Biological Station, Lake Texoma.

CALENDAR 1973

4-11 August FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, Boulder, Colorado.

INDIVIDUALS AND INSTITUTIONS

The ASSOCIATION OF ACADEMIES OF SCIENCE (AAS) will hold two meetings on Environmental Education (pollution, conservation, recreation) at the AAAS Meeting in Philadelphia on 27 December. The first of these meetings will be 9:00-10:30 AM, the second, 2:00-4:30 PM.

KRAIG ADLER, DAVID M. DENNIS, and DAVID H. SNYDER have been working in the Sierra Madre del Sur of Mexico. They have prepared an itinerary (showing elevations) of a trip from "Casa Verde" (about 20.5 mi N of Chilpancingo) across the mountains of Atoyac, and also a base-map of this region. These are available to interested persons upon request (Kraig Adler, Dept. Biol., Univ. Notre Dame, Notre Dame, IN 46556).

GEORGE CALLISON (Los Angeles Co. Mus. Natur. Hist.) is "putting final touches on his manuscript concerning evolutionary relationships of the New World Boidae...[and] describing an Oligocene pelobatid." (Soc. Vert. Paleont. Newslett.).

The FIRST INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY, sponsored by the Society of Systematic Zoology and the International Association for Plant Taxonomy, will be held at Boulder, Colorado, 4-11 August 1973.

Our change-of-address files show that herpetologists are a travelling bunch these days:

W. N. BRADSHAW (to W. Va. U., Morgantown, WV 26506); WILLIAM F. PRESCH (to U. Cal., Berkeley, CA 94720); OSVALDO K. REIG (to U. Coll. London, Gover St., London WC 1, England); MAX ALLEN NICKERSON (to Milwaukee Publ. Mus., Milwaukee, WI 53233); J. KIRWIN WERNER (to N. Mich. U., Marquette, MI 49855); RICHARD WASSERSUG (to Field Mus. Natur. Hist., Chicago, IL 60605); GERHARD A. SCHAD (to Johns Hopkins U., Baltimore, MD 21205); GEORGE R. ZUG (to New Guinea for 6 months); GEORGE GORMAN (to Coll. Virgin Islands, St. Thomas, VI 00801, for at least a year).

Also CLIFFORD R. JOHNSON (to U. New England, Armidale, N.S.W., Australia) writes that he is involved in defensive displays in Australian snakes, monitor behavior, thermoregulation in various reptiles, and the effectos of pollution and various chemical sprays on reptiles.

JAMES LAZELL (Mass. Audubon Soc.) and JOHN MUSICK (Va. Inst. Marine Sci.), collaborators with the National Park Service, write that they are working on the herpetology of the Outer Banks of North Carolina. The area is largely included within the Cape Hatteras and Cape Lookout National Seashores, where collecting is prohibited. Lazell & Musick report that initial evidence indicates that a long-snouted, heavily-whitened race of the kingsnake, Lampropeltis getulus sticticeps Barbour & Engels, is apparently valid. The black-bellied saltmarsh Natrix sipedon of this region is also apparently a valid, distinct form, but its taxonomy is complex. On the Natrix question Lazell and Musick are working in close cooperation with Roger Conant, who has amassed specimens and data from this region over many years. An apparently distinct ecological zone, with a "salt-spray climax" (Burk, C. J. 1962. The North Carolina Outer Banks: a floristic interpretation. J ELISHA MITCHELL SCI SOC 78(1): 21-28) of live oak and red cedar, and including Index plants like stemless palmetto, occurs between Cape Hatteras and Cape Lookout. Floristic and herpetological intergradation with the mainland occurs on the Banks north of Cape Hatteras.

MEMBERS' DESIDERATA

ROBERT G. SPRACKLAND JR. (R.D. 1, Box 87, Jackson, NJ 08527) would like live lizards from Australia, Asia, and Africa for a project concerning comparative behavior and interrelations of genera.

GARY EBERLE (Mus. Zool., Louisiana State Univ., Baton Rouge, LA 70803) needs live specimens of Clonophis kirtlandii and Thamnophis butleri for chromosome studies.

THOMAS ZACCONE (Dept. Herpetology, American Museum of Natural History, New York, NY 10024) would appreciate live specimens (with locality data) of Diadophis and Heterodon for chromosome studies.

TERRY E. GRAHAM (Dept. Biol., Worcester State Coll., Worcester, MA 01602) is attempting to assemble a teaching collection of preserved herps of the eastern U.S. He would like to hear from collectors who might be able to provide him material with locality data. He will provide a want list upon request, and will be happy to arrange for transportation of the specimens. He is also interested in purchasing, for cost of duplication, color slides of North American herps.

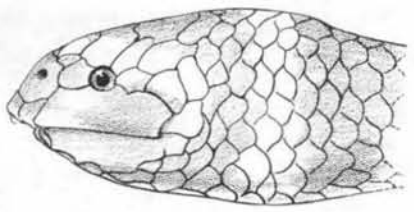
H. BERNARD BECHTEL (2101 North Patterson, Valdosta, GA 31601) is compiling a file of the laws that pertain to amphibians and reptiles, pro and con. He would appreciate copies or references to new laws that are passed, and to have old and obscure laws brought to his attention. The results of this compilation are expected to be published in the 1972 YEARBOOK OF HERPETOLOGY, and if possible portions will be published in H R.

STEVEN WEINKSELBAUM (3010 Clarendon Road, Brooklyn, NY 11226) is interested in buying or trading for out-of-print or rare books on herpetology.

PAUL L. SWANSON (R.D. 2, Polk, PA 16342) would like to sell his copies of COPEIA (1931-1951, 1952 (1,2), and #170 (1929), a total of 83 copies), and HERPETOLOGICA (vol. 1-7, 13).

PETER J. KAPLAN (7 Harwich Rd., Providence, RI 02906) would like to contact anyone who has had experience keeping pygopodid lizards in captivity.

JAY M. SAVAGE (Dept. Biol. Sci., Univ. Southern Calif., Los Angeles, CA 90007) is working to complete his checklist and key to the amphibians of Costa Rica, so that it may appear in published form prior to the meetings of the ASIH in Costa Rica during 1973. For this reason, he would like to be kept informed of plans for publication, of descriptions of new Costa Rican species, of records of species previously unknown in the Republic, or of specimens establishing substantial range extensions in Costa Rica, so that the manuscript may be kept up to



date with the latest information until going to press. Workers with publication plans are urged to proceed as rapidly as possible so that their material may be included in the checklist.

CRAIG E. NELSON (Dept. Zool., Indiana Univ., Bloomington, IN 47401) would like live Ambystoma, collected from in or near breeding congresses, for interspecific hybridization experiments. Nominal sum paid (call 812-337-9485 for additional details).

L O S T M E M B E R S

Publications of the SSAR or H L have been returned from the following addresses marked "Not Known" or "No Forwarding Address." We would appreciate any aid in obtaining current addresses for these members.

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LEE ROBERT BAKER, Dept. Biol. Sci., Nevada Southern Univ., Las Vegas, NV 89109.

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BENTON B. ANDERSEN, Biology Museum, Univ. Nevada, Las Vegas, NV 89109.

RICHARD DUNN, P.O. Box 613, Arcadia, CA 91006.

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ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be type-written on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $23.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/8 inches (one column) or 9 1/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 12 3/4 inches). Line cuts are reduced about 25 per cent in processing. [See also the special instructions for "Un-reviewed."]

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.

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"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

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AND THE PEOPLE WHO STUDY THEM

VOLUME 3, NUMBER 4
AUGUST 1971

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HERPETOLOGISTS' LEAGUE

by

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS

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ARTICLES

63 THE ALBUQUERQUE MEETING. The program and abstracts of papers for the joint SSAR - H L meeting are given.

68 SCIENTIFIC HERITAGE OF AN EMINENT SOVIET HERPETOLOGIST. In memoriam Prof. Pavel Victorovich Terentyev, by L. J. Khosatsky & I. S. Darevsky.

UNREVIEWED-UNEDITED COMMUNICATIONS

71 KARYOTYPIC VARIATION AND RELATIONSHIPS OF THE CALIFORNIA LEGLESS LIZARD Anniella pulchra Gray (Reptilia: Anniellidae), by R. L. Bezy & J. W. Wright.

73 RANGE EXTENSIONS FOR GEORGIA AMPHIBIANS AND REPTILES, by C. H. Wharton & J. D. Howard.

75 A NEW "SYRINGE" FOR INJECTING HERPTILES, by Morris K. Jackson.

76 THE EGG-ALGA RELATIONSHIP IN Ambystoma t. tigrinum, by James D. Anderson, Dawn D. Hassinger, and George H. Dalrymple.

77 ESTIMATING LIZARD HOME RANGES, by Frederick B. Turner.

DEPARTMENTS

62 EDITORIAL

T-59 CURRENT HERPETOLOGICAL TITLES

NEWS AND ANNOUNCEMENTS

67 Herpetology at Tel-Aviv University
78 Caribbean Research Page
78 Meetings and Societies
78 Individuals and Institutions
79 Herpetology at the University of Rhode Island
79 Corrigendum (HR 3(2): 37)

SOCIETY NOTES

62 The Herpetologists' League
62 The Society for the Study of Amphibians and Reptiles
67 Members Desiderata
80 Advice to Authors
80 Changes of Address
80 Membership and Subscriptions

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S S A R

The Society was founded in 1958 as THE OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communications between amateur and professional workers.

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E D I T O R I A L

The AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, at its annual meeting in June, allowed a second step to be taken toward the unification of herpetologists and their information systems. [The first step was the "Unification Committee," appointed by the SSAR and the H L in December, 1970.] The ASIH Board of Governors approved the transfer of the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES from ASIH sponsorship to that of the SSAR.

The members of the Catalogue Committee had voted unanimously to request this move in December, 1970, and it was notable that the ASIH Board allowed the release of the Committee and its assets without opposition from any member.

The Committee members believe that association with a purely herpetological society will strengthen its base of support within the community. In turn, the assets of the Catalogue will serve to strengthen the financial base of the SSAR. -- HGD.

HERPETOLOGISTS' LEAGUE

The Herpetologists' League is an international organization established by Major Chapman Grant in 1936. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1970 it had 940 members and fellows, 24 life members, 10 honorary members, and 400 institutional subscriptions to its journal, HERPETOLOGICA.

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PROGRAM

OF THE

ALBUQUERQUE

MEETING

18 - 22 August 1971

WEDNESDAY, AUGUST 18, 1971

9:00 AM Board Meeting
Biology 167

12:00 NOON Lunch

1:30 PM Resume Board Meeting
Biology 167

3:00 PM Early registration and check in
Biology 37 and
Santa Clara Dormitory

THURSDAY, AUGUST 19, 1971

8:00 AM Registration (all day)
Biology Building

8:00 AM Dormitory Check-in
Santa Clara Hall

9:00 AM Herpetology Division Open House
Biology 35, 37, 52

9:30 AM Field Trips
To be announced

2:00 PM Wives get-together
To be announced

2:00 PM Herpetology Division Open House and Round-table Discussion of individual herpetological interests.
Biology 35, 37, 52

8:00 PM Smoker and Social
To be announced

FRIDAY, AUGUST 20, 1971

8:30 AM CALL TO ORDER: Robert E. Gordon (University of Notre Dame), Chairman of S.S.A.R.

WELCOME: Ferrel Heady, President, The University of New Mexico
New Mexico Union

Invited Papers on the Theme: THE ECOLOGY OF ARID-ADAPTED AMPHIBIANS AND REPTILES, Charles M. Bogert, Presiding.

8:45 AM EVOLUTION AND BIOGEOGRAPHY OF THE SOUTHWESTERN HERPETOFAUNA. Charles H. Lowe (Univ. of Arizona).

9:30 AM TRANSIENT ENERGY BUDGET STUDIES: THEIR IMPLICATIONS FOR ANALYSIS OF BEHAVIOR, PHYSIOLOGY, AND PREDATOR-PREY INTERACTIONS OF DESERT REPTILES AND OTHER ANIMALS. Warren P. Porter, J.W. Mitchell, W.A. Beckman and C.B. De Witt (Univ. of Wisconsin, Madison).

10:15 AM Coffee Break
Snack Bar

10:30 AM Business Meeting: "WHERE DOES SSAR STAND TODAY?"
New Mexico Union

11:45 AM Group Photo
To be announced

1:00 PM INVITED PAPERS (continued)
New Mexico Union

1:00 PM WATER AND ELECTROLYTE BALANCE OF DESERT REPTILES. John E. Minnich (Univ. of Wisconsin, Milwaukee).

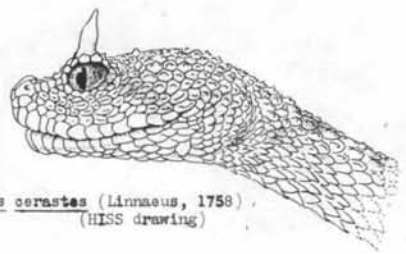
1:45 PM ENERGY FLOW IN SOUTHERN NEVADA POPULATIONS OF UTA STANSBURIANA: A THREE-YEAR ANALYSIS. Frederick B. Turner, Bruce W. Kowalewsky and Philip A. Medica (Univ. of California, Los Angeles).

3:00 PM Coffee Break

3:30 PM TEMPERATURE REGULATION IN DESERT AMPHIBIANS AND REPTILES: PAST, PRESENT, AND FUTURE STUDIES. Bayard H. Brattstrom (Calif. State Coll., Fullerton).

4:15 PM FOOD NICHE DIMENSIONALITY AND OVERLAP IN THREE SYMPATRIC SPECIES OF SCAPHIOPUS. Arthur E. Dunham (Univ. of New Mexico).

8:00 PM Banquet



Cerastes cerastes (Linnaeus, 1758).
(HISS drawing)

SATURDAY, AUGUST 21, 1971

CONTRIBUTED PAPERS

9:00 AM A HISTOLOGICAL STUDY OF THE THIRD EYE AND RELATED STRUCTURES IN SCINCID LIZARDS. G. Craig Gundy and Charles L. Ralph (Univ. of Pittsburgh).

9:20 AM EFFECT OF NUTRITIONAL STATUS ON TEMPERATURE REGULATION IN THE LIZARD KLAUBERINA RIVERSIANA. Arthur B. Robertson (New Mexico State Univ.).

9:40 AM WATER LOSS IN AGGREGATED VS. ISOLATED SALAMANDERS. Westley Lagerberg and Bayard H. Brattstrom (Calif. State Coll., Fullerton).

10:00 AM Coffee Break

10:30 AM FIELD OBSERVATIONS OF AGGRESSION BETWEEN GRAVID ANEIDES AENEUS FEMALES IN A NEST CREVICE. David H. Snyder (U. of Notre Dame).

10:50 AM VARIATION IN THE LIFE HISTORY OF THE SALAMANDER GYRINOPHILUS PORPHYRITICUS. Richard C. Bruce (West. Carolina Univ.).

11:10 AM POLARIZED LIGHT: POSSIBLE SIGNIFICANCE OF THE PLANE OF POLARIZED LIGHT IN ORIENTATION OF SALAMANDERS. Douglas H. Taylor (U. Notre Dame).

11:30 AM CONTROL OF THE CIRCADIAN RHYTHM OF LOCOMOTION IN TARICHA GRANULOSA. Jeffrey L. Briggs (Wisconsin State Univ.-Whitewater).

SUNDAY, AUGUST 22, 1971

8:00 AM CHECK-OUT OF DORMITORY (by 10:00 AM)

8:00 AM FIELD TRIPS



Photograph of Eumeces inexpectatus with her nest in situ, in a "hammock" near Miami, Florida. David Molchos (9400 Martinique Dr., Miami, FL 33157).

BRATTSTROM, BAYARD H. (Calif. State Coll., Fullerton). Temperature regulation in desert amphibians and reptiles.

The initial studies on thermoregulation in desert reptiles by Cowles and Bogert showed that these ectotherms regulated their body temperature by behavioral means. Recent studies have shown that temperature regulation in desert amphibians and reptiles is not only behavioral, but involved a large number of subtile and effective physiological mechanisms that are used by these forms to modify their physiology independent of temperature or to regulate their body temperature by physiological mechanisms. This diversity of mechanisms allows desert amphibians and reptiles to exploit the thermal mosaic of the desert environment for the best utilization of energy sources with the least amount of competition.

Briggs, Jeffrey L. (Wisconsin State University-Whitewater). Control of the Circadian Rhythm of Locomotion in Taricha granulosa.

Over 56,000 hours of locomotor activity of Taricha granulosa were recorded using two types of low cylindrical plastic monitoring chambers. This species shows distinct rhythms of activity under normal day-night cycles, shortened day-night cycles, constant darkness (DD) and constant light (LL). The rough-skinned newt is day active and crepuscular. I found that 62% of the animals tested show their peak activity within 8 hours of the light-on cue and 71% within 12 hours. The activity peaks are random with respect to the light-off cue. In addition they follow "Aschoff's Rule" for circadian rhythms as it applies to day-active animals: (1) They show a longer period under DD (mean=24.72 hours) than LL (mean=23.7 hours) and (2) the period decreased with increasing intensity of light under LL. However, the number of animals which show arrhythmia increased with increasing intensity. Entrainment to the light-dark cycle is evident and the activity cycle could be phase-shifted by changing the phase relationship of the light cue. Although newts can entrain to temperature pulses (cold from 9°C to 4°C) under constant light, they entrain to the light cycle when given a choice between light and temperature. Activity generally ceases below 6°C regardless of the state of the light-dark cycle. There is no apparent difference between eyeless and intact newts in the ability to use light cues in entrainment. The site of the receptor was narrowed only to the dorsal midbrain

---

BRUCE, RICHARD C. (West. Carolina Univ.). Variation in the life history of the salamander Gyrinophilus porphyriticus.

Two life history patterns, designated alpha and beta, were observed in populations of Gyrinophilus porphyriticus in the Blue Ridge Mountains of North and South Carolina. Alpha populations from the Blue Ridge Embayment and adjacent regions are characterized by early attainment of sexual maturity following metamorphosis, small adult body size, and small clutch size. Beta populations from the Nantahala and Balsam Mountains show delayed attainment of sexual maturity following metamorphosis, large adult body size, and large clutch size. Clutch size increases with body size in each population, but the relationship differs in alpha and beta groups. The distribution of body sizes is similar for males and females in each population; however, males mature at a smaller size than females. All populations show a 1:1 sex ratio. The findings suggest that the current taxonomic arrangement for this species in the southern Blue Ridge is misleading and inadequate.

Dunham, Arthur E. (The University of New Mexico) Food niche dimensionality and overlap in three sympatric species of Scaphiopus.

In spite of its central importance in current population theory, few studies of food niche dimensionality and overlap among closely related sympatric species have been forthcoming. This paper documents interspecific and intraspecific differences in certain parameters of the food niche among three sympatric species of Scaphipus occurring in New Mexico. The breadth of the food niches of these three species of toads were determined with regard to prey size and the amount of energy obtained from each prey species. The degree of overlap among the food niches of these three closely related species was measured. The process of resource allocation along the gradient of prey size is demonstrated. The distribution of the prey items in the diets of each of these three predators is compared to the relative abundance of the prey species in the field. These toads approach the range of available prey items as a mixture of at least three coarse grained patches. Additionally, an information theory index of food niche breadth is used to compare toad populations in which the number of anuran species varies. Evidence is presented lending credence to the contention that interspecific competition is responsible for positioning of niche boundries.

GUNDY, G. CRAIG and CHARLES L. RALPH (Univ. of Pittsburgh). A Histological Study of the Third Eye and Related Structures in Scincid Lizards.

The morphology of the parietal eye and related dorsal circumventricular structures was studied in seven species of the family Scincidae, including one species from the subfamily Acontinae and one from the subfamily Feylininae. Formalin-fixed specimens were embedded in paraffin, sectioned at 10 microns, and were stained in hematoxylin and eosin and Patay's triple stain. The limbless burrowing species Acontias percivali and Feylinia currori both lack a parietal foramen. There is a thinning of the bone in Acontias, but no trace of a foramen in Feylinia. Both species, especially Acontias, have degenerate parietal eyes. Riopa sundevalli and Chalcides chalcides are forms with reduced limbs. Chalcides, the more primitive of the two (according to Greer,1970), has a well-developed parietal eye and foramen. Riopa has an elaborate parietal eye, but there is only a thinning of the skull rather than a definite opening. Eumeces obsoletus, Eumeces fasciatus, and Lygosoma laterale are diurnal species with well-developed limbs. They all have a large parietal foramen and a well-developed parietal eye. These data suggest that a subterranean habit may result in regression of the parietal complex. This is consistent with the current hypothesis of a photoreceptive function for the parietal eye.

LAGERBERG, WESTLEY and BAYARD H. BRATTSTROM (Calif. State College, Fullerton). Water loss in aggregated vs. isolated salamanders.

The salamanders, Aneides lugubris, A. ferreus, and A. flavipunctatus tend to isolate themselves when placed in simple aquaria with numerous rock caves. If the aquarium sand is allowed to become dry, the Aneides will aggregate. Such aggregation would reduce water loss by reducing the surface area exposed to the air and sand. Tested experimentally in an open air-flow system, three isolated Aneides flavipunctatus (combining weights) lost weight considerably faster than three aggregated A. flavipunctatus. Aggregation behavior is thus a useful mechanism to avoid desiccation.

LOWE, CHARLES H. (Univ. of Arizona). Evolution and Biogeography of the Southwestern Herpetofauna.

(Abstract not received).

MINNICH, JOHN E. (Univ. of Wisconsin). Water and Electrolyte Balance of Desert Reptiles.

Although reptiles have been successful in occupying deserts, few studies have been performed on their water and electrolyte budgets in the field. Because they occupy a dry, seasonally hot environment, desert animals face problems of procuring and conserving sufficient water. Unlike certain desert rodents, reptiles cannot balance their water losses through the production of metabolic water. They usually obtain most of their water from their food. The osmotic and electrolyte concentrations in the food of most desert reptiles frequently exceeds those of their body fluids. This, coupled with the loss of ion-free water through evaporation, makes it necessary for them to excrete electrolytes with a small loss of water.

During the driest time of the year, certain reptiles exhibit decreases in body water content and changes in body fluid distribution (Amphibolurus ornatus, Sauromalus obesus), but others do not (Dipsosaurus dorsalis, Uma scoparia). Osmotic and electrolyte concentrations increase in the body fluids of A. ornatus and Gopherus agassizii, but do not change in most other species (D. dorsalis, S. obesus, U. scoparia).

Several species drink rainwater when it becomes available, but most do not rely on drinking for maintenance of normal body water and electrolyte content. Two important exceptions are A. ornatus and G. agassizii. Rainwater consumed by A. ornatus is used to excrete sodium stored during dry periods. G. agassizii drinks rainwater and stores it in the urinary bladder, where it functions as a water reserve.

Reptiles curtail evaporative water losses by behavioral means. During summer they are active during the cooler daytime hours or at night. When inactive, they spend long periods in burrows, where the higher humidities and minimal activity curtail water losses. Certain species (G. agassizii, S. obesus) become inactive for several days during the driest part of the year.

Desert reptiles excrete most salts with a minimal water loss through a nasal salt gland and in the urine as insoluble urate salts. Much of the ingested potassium and most chloride, along with lesser amounts of sodium and bicarbonate, are excreted through the salt gland. In certain species (e.g., A. ornatus) the salt gland is absent and in most others the salt gland is incapable of excreting all of the ingested salts. Most of the remaining potassium and sodium are excreted in the urine as urate salts. The low solubility of these salts, coupled with water reabsorption form the cloaca, permit excretion of large quantities of inorganic cations with a small loss of water. The desert tortoise stores urate salts and uric acid in the bladder for long periods.

PORTER, W.P., J.W. MITCHELL, W.A. BECKMAN and C.B. DE WITT (Univ. of Wisconsin). Transient Energy Budget Studies: Their Implications for Analysis of Behavior, Physiology, and Predator-Prey Interactions of Desert Reptiles and Other Animals.

Transient energy balance models have been developed for bare-skinned animals and for desert micrometeorology. The models predict animal temperatures and locations in the environment as a function of time of day and day of the year. As an explicit example, the activity patterns for the desert iguana, Dipsosaurus dorsalis are outlined. The development and testing of the models in the laboratory and in the field are described. Predicted activity patterns of other animals are also described. Intergration of the patterns and some field tests of the predictions are discussed as well as additional potential uses for the tools we have developed.

ROBERTSON, ARTHUR B. (New Mexico State Univ.). Effect of nutritional status on temperature regulation in the lizard Klauberina riversiana.

In order to further elucidate physiological parameters of the phenomenon of preferred body temperature, a study was conducted to determine the effect of diet on the pb+. Six animals were fed and watered and six animals were watered only for two weeks at a time. Six runs were conducted; cloacal temperatures were taken each day; the first three runs were under a constant light regime, the last three runs were under a L:D::6:18 pattern. Each animal was provided with a thermal gradient ranging in temperature from 10°C at the cold end to 85°C under the heat lamp. During the first 3 runs there was no significant difference in body temperatures of the starved and fed groups. There was an initial drop in temperatures of both groups from day one to three; then temperatures stabilized throughout the remainder of the run. Upon initiation of the light cycle L:D::6:18, the temperatures of the two groups diverged significantly with fed animals maintaining a higher body temperature. The initial drop in temperatures for the first few days was not as apparent. This work illustrates the lability of the preferred body temperature and suggests reduction of body temperature in response to starvation may be an adaptive mechanism to withstand periods of reduced food availability.

SNYDER, DAVID H. (U. of Notre Dame). Field observations of aggression between gravid Aneides aeneus females in a nest crevice.

In late May, 1970, night observations were made of a rock crevice population of Aneides aeneus at Highlands Biological Station in western North Carolina. A prolonged and intense aggressive encounter, involving forebody-bobbing, lunging, tail lashing and biting was observed between two gravid females occupying the same nest crevice. This crevice was subsequently used as a nest site by a single female. A male in the same crevice was not directly involved in the aggression, though he did briefly court one of the females. The literature on aggression in salamanders, which is reviewed, is meager and has usually concerned captive animals.

TAYLOR, DOUGLAS H. (U. Notre Dame).

Polarized light: possible significance of the plane of polarized light in orientation of salamanders.

Tiger salamanders (Ambystoma tigrinum mavortium) were trained along a specific axis in an indoor training tank under polarized light. Indoor orientation tests were conducted in a circular arena completely enclosed in black plastic. Under the same polarized light source in the test arena, the directional responses of the salamanders was the same to the plane of polarization under which they had been trained. Shifting the plane of polarization by 90 degrees, in either direction, resulted in corresponding shifts in the orientational responses of the salamanders. (Supported by NSF Postdoctoral Fellowship No. GU-2058, Indiana Academy of Science Grant 95074 and by NIH Biomedical Grant NIH-FR07033-05 to K. Adler)



TURNER, FREDERICK B., BRUCE W. KOWALEWSKY and PHILIP A. MEDICA (Univ. of California). Energy flow in southern Nevada populations of Uta stansburiana: A three-year analysis.

Energy flow of Uta stansburiana in southern Nevada was estimated for a three-year period (1965-8) using a computer model calculating hourly changes in body temperatures of individuals and daily changes in the numbers and body weights of individuals making up the population. Annual energy flow ranged from 0.18 Kcal/m2 in 1965-6 to 0.27 Kcal/m2 in 1966-7. Annual production ranged from 0.033 Kcal/m2 in 1965-6 to 0.056 Kcal/m2 in 1967-8.

Ratios of production to energy flow varied from 18% (1965-6 and 1966-7) to 27% in 1967-8 (cf. 1-2% in birds and mammals), so Uta is similar to ectothermic invertebrates in this respect. Uta annual energy flow (ca. 0.2 Kcal/m2) was only about 3.5% that of Dipodomys merriami and 9% that of Lepus californicus in southern Arizona, but exceeded the energy flow of three of the eight resident mammals studied by the Chews. Annual production by Uta (ca. 0.046 Kcal/m2) was about the same as that reported for Dipodomys merriami in Arizona (0.053 Kcal/m2) and exceeded that of the other southern Arizona mammals.

The energy flow analysis was predicted on the lowest existing measurements of Uta respiratory metabolism (Roberts); estimates of total metabolism using measurements by Dawson and Bartholomew were 3-4 times higher. The use of these latter respiratory rates would increase energy flow estimates roughly 3-fold and lower the production/energy flow ratios to around 6.5 - 8%. There is no clear-cut rationale for choosing between the two physiological models.

HERPETOLOGY AT

אוניברסיטת תל-אביב

TEL-AVIV UNIVERSITY

H. Mendelssohn celebrated his 60th birthday on 30 October 1970. Instead of the usual "Festschrift," his associates presented him with a cover (see photo) in which dedicated articles published in various journals will be assembled. He was recently awarded the "Weizmann Prize in Natural Sciences" by the Tel-Aviv Municipality.

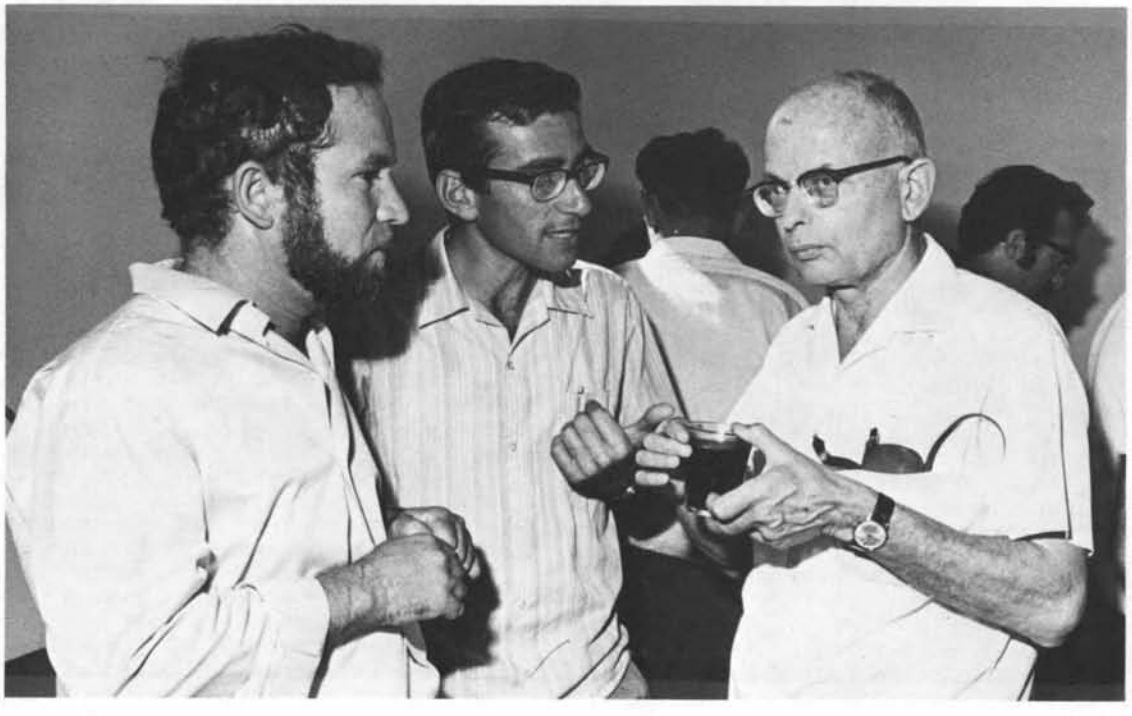
One of Mendelssohn's students is continuing work on the behavior of Agama stellio and A. agama lionotus. Avner Bdolah and students, working in Elazar Kochva's laboratory, are separating, purifying, and preparing antisera of enzymes from Vipera palaestinae venom, to be used in following the synthesis and secretion of these components by the venom glands. Raya Brown is doing the final calculations of enzyme secretion for her Ph.D., and Gedalia Frenkel's "Visceral anatomy of Vipera palaestinae: an illustrated presentation," has just appeared in the Israel Journal of Zoology.

Israel Duvdevani has finished his Ph.D. dissertation on salt and water metabolism of Acanthodactylus lizards, in which he describes the differences between the four Israeli species inhabiting arid and semi-arid biotopes. He found salt glands in all, and recorded the lowest oxygen consumption and evaporative water loss in A. boskianus, which is considered the best desert-adapted species of the genus. -- EK.



(ABOVE) Cover of "non-festschrift" dedicated to Dr. Mendelssohn, prepared by R. Kalef. (Photo by A. Shoob.)

(BELOW) H. Mendelssohn (right) at his birthday celebration on 30 October 1970, with some of his associates. [Both they and the reptile in his pocket are unidentified.] (Photo by A. Shoob.)



SCIENTIFIC HERITAGE OF AN EMINENT SOVIET HERPETOLOGIST

(In memoriam Prof. Pavel Viktorovich Terentyev, 1903-1970)

By L.J. Khosatsky and I.S. Darevsky

On December 30, 1970 in Leningrad at the age of 67 passed away a well-known Soviet Zoologist, prominent specialist in the fields of batracho-herpetology and biometrics, professor of the Leningrad State University P.V. Terentyev.

Pavel Viktorovich Terentyev was born in Sevastopol on December 23, 1903. Educated by his family in the spirit of striving for the heights of knowledge and devoted service to Science, he showed a passion for natural sciences from eary childhood. Having entered the Moscow State University he began his scientific activity as an assistant at the Darwin Museum in Moscow when he was but an eighteen-year old student. Later, already a research scientist in herpetology, he was placed at the head of the Scientific Department of a large terrarium of the Moscow Zoological Gardens. He then worked in a number of scientific institutions of Moscow, Kazan, Arkhangelsk etc. Beginning in 1934, and up to the day of his death, his life was closely bound to the Leningrad State University where he worked his way up from Assistant to Professor of Vertebrates in the Department of Zoology. From 1954 to 1965 he was the head of this Department; it was he who later organized the Scientific Section of Biometrics, at the University, at the head of which he stood all the last years of his life.

Beside his work at the University, P.V. Terentyev for a number of years worked at the Zoological Institute of the Academy of Sciences of the USSR.

His interest in exhaustive study of amphibians and reptiles awoke in his early years and accompanied him through all his life; his fruitful activities in this branch make hime one of the best herpetologists of our time. It is probable, however, that the outstanding progress for which herpetology is obliged to the scientific work of P.V. Terentyev was achieved mainly because the scientist never confined himself to any narrow branch of investigation. Being a zoologist of a broad University-type he showed keen interest in a variety of problems and trends of general biology.

He left a bright trace in the investigations of theoretical systematics, biogeography, and - particularly - in biometrics. The use of mathematical methods in the solution of biological problems had a strongest and permanent attraction for P.V. Terentyev from his very youth. He was an ardent propagandist of deep research in the development of biometric theory and methods; his own contribution in this field has been very important, particularly in the solution of a number of complicated problems of amphibian and reptile systematics. At the same time, for a versatile development of the application of biometrical methods to a possibly wide range of objects, P.V. Terentyev investigated from this point of view not only the amphibians and reptiles, but also fishes, birds, molluscs, and even some plants. His cherished dream was to use a wide range of the most important groups of organisms as simulation objects for the building of the theory of biometrical methods.

Scientific interests of P.V. Terentyev in the field of batracho-herpetology from the very beginning of his scientific activity were mainly within the range of research of amphibians, primarily of ecaudates. Being for a long time largely recognized as a batrachologist, P.V. Terentyev gave much consideration to the study of reptiles, since he was always true to his idea of maximum broadening of the field of scientific research. His most important scientific achievements in these two sections of vertebrate zoology were reflected in many publications, and primarily in some of his monographs. First of all we must mention here "The Key to Reptiles and Amphibia", which he wrote in collaboration with another prominent Soviet herpetologist the late S.A. Chernov.

This book is by far broader than a usual "Key". Being essentially a concise encyclopaedia of Soviet Union batracho-herpetology, this book, - after the well-known summaries by A.M. Nikolsky (1905, 1915, 1918), - gives in a concise form and at a modern level of science all the basic data on amphibia and reptiles of this country and thus of a large portion of our planet. Therefore it is but natural that the book found a wide response and ran into five editions, including one English edition (the first Soviet edition appeared in 1936, the last - in 1949, the English edition in 1965).

P.V. Terentyev's "Herpetology" (1961, English edition -- 1965) is of great interest for both scientists-zoologists and for students, being one of the first works of this kind in the world zoological literature. The author undertook the difficult task of giving an integrated review of the philogenesis, particular systematics, geographic spreading, and some data on the biology of the lower terrestrial vertebrates. The author used here a most original way of reducing the characteristics of taxonomic groups (including major genera) into Swedish dichotomic tables; though it made the characteristics too concise, it saved much space. Of very great value are the maps of the distribution of all existing families of amphibians and reptiles, as well as original phylogenetic diagrams worked out at family level for the existing groups, and at ovdinal level for those extinct. Special

chapters dealing with the problems of origin of amphibians and reptiles are also of considerable interest.

"The Frog" (1950) - a large monograph by P.V. Terentyev - holds the lead among his scientific publications. Published in a series of text-books for the deeper study of laboratory animals, this monograph surpassed by far the usual publications of this type both by its general content and the level of scientific thought. The largest section of the book deals with frog morphology, which is considered in a detailed description of separate systems of organs. The author also considered the general structure of these animals and the variability of external characteristics. The section dealing with systematics considered the phylogenetic interrelations of suborders and families of ecaudates, as well as the subgenera and species of the genus Rana. Major data on frog ecology are also given there in adequate detail.

P.V. Terentyev published about 150 papers, mainly on batracho-herpetology. The versatile research activity of the scientist involved various problems of amphibian and reptile biology. He also studied very intensely the above-mentioned animals from the point of view of faunistics, systematics, and zoogeography. The problems of the use of methods of mathematical statistics play a special role in his scientific activities in the above branches of zoology. The researches of P.V. Terentyev in the field of biometrics were carried out mainly in connection with the study of amphibians and reptiles, the result being that complex problems in the systematics and zoogeography of amphibians and reptiles found new and convincing solutions. At the same time some general essential theoretical problems of biometries were developed in using the batracho-herpetological material. Investigations in the problems of theoretical systematics form another important part in the scientific heritage of P.V. Terentyev. A more detailed consideration of the above-noted trends in his scientific activities is given below.

Some of the early papers by P.V. Terentyev, comprising his first scientific publications are concerned with the study of amphibia and reptiles as representatives of faunistic complexes which characterize the nature of certain regions and localities of the Soviet country. Among this group of publications on faunistics, attention is attracted by a small book published in 1924 on amphibians of the former Moscow province. Though written by a very young scientist, the book gives an interesting and adequately complete review of Moscow region batrachofauna. Together with other data, the book gives identification tables for families and species of amphibia inhabiting the central regions of the European part of the USSR, which were compiled by the author, and also a table for identifying the larvae and spawn of these species. In other herpetofaunistic papers the author deals with data on chuvashia, the North Caucasus, and the Sakhalin and Kuril islands.



PAVEL VIKTOROVICH TERENTYEV

An extensive series of Terentyev's works on the systematics of ecaudate amphibia is the best known and attracts the keenest attention of batrachologists. The most important among the works of this series are his investigations on the taxonomic position of the brown frog and the green frog. The author also investigated the taxonomic correlation between different forms of the genera Bombina, Pelodytes, Bufo, and Hyla. P.V. Terentyev's contribution to the study of systematics of different representatives of batrachofauna was very significant: he developed the techniques of taxonomic analysis of separate forms, and the standardization of the technique of this study. In this respect he thoroughly worked out standard diagrams of amphibia morphometry, evaluated the relative value of various measurements, and suggested the most important indices. The author paid great attention to the study of peculiarities in geographic variability of different taxonomic characteristics of amphibia, and of green frogs in particular. All data of the taxonomic study of any given form were always subjected to biometrical analysis, which revealed the basic regularities of individual, age and geographical variability.

Zoogeographical studies of P.V. Terentyev are closely bound to his purely taxonomic works. His above-mentioned works on the study of geographic variability of amphibia allowed him to come to a conclusion that this variability is characterized as a rule by the so-called clinal type of successive transformations of different morphological characteristics. He made interesting suggestions on the variable size of ranges of different animal species and on the wealth of island faunae; in connection with that he developed a foundation for the rule

of correlation between the number of species and the size of area they inhabited. His most important zoogeographical work should be considered as a very interesting experience in the use of mathematical statistics in this field. This work, for which the author was awarded the degree of Doctor of Sciences in Biology, is an original analysis of quantitative data on the geographical distribution of nearly all the snakes of the world fauna, taking into account the size of species and generic ranges. A special emphasis is made here on finding the relation between the number of snakes in different faunae and their belonging to a particular geographical zone, characterized by certain climatic temperatures. P.V. Terentyev studied in particular the relation between climatic temperatures and the size of snakes and ecaudate amphibia: as a result of these studies he found it possible to state that there exists a regular relation between absolute dimensions of the body both for warm- and cold-blooded animals and the environment temperature. This relation, however, has no direct expression, but is characterized by differences in types of organism response to the action of temperature and other environmental factors in different conditions. In accordance with this statement, P.V. Terentyev demonstrated in particular that the well-known "Bergman rule" is not of absolute value and obeys the universal rule of optimum as a particular case. The most favourable existence in the zone of optimum effect of a particular factor for the given organism generally results in a maximum increase of body size; any deviation from the optimum, on the other hand, results in oppressing the organism and in the reduction of its size. The universal character of the optimum rule, as demonstrated by P.V. Terentyev, is a universal biological regularity, which implies physiological, taxonomic, and biogeographical phenomena.

On the base of the exhaustive taxonomic study of different animals and - primarily - of amphibia and reptiles, P.V. Terentyev, as already stated, made an important contribution to the theory of biometrics. We can here but briefly mention his studies of the actual value of Pirson-type distribution curves for biological objects, of the part played by the index-method in systematics, of the possible use of variance and iteration method for evaluating the qualitative riches of fauna, and for quantitative stock-taking of animals. But the greatest theoretical and practical value in this fiels is the doctrine of correlation pleiads of taxonomic characteristics which he has developed. The part played by this doctrine and by the actual techniques of taxonomic analysis which are based on it should receive the highest possible estimate; these techniques find now an increasingly wide use both with zoologists and botanists.

Many of Terentyev's works are very important for theoretical systematics and for the evolution theory. It should be noted in this respect that he was the first to apply the rule of parallel rows of homological characteristics to amphibia. The study of the already mentioned clinal geographic variation of the intra-species forms in connection with the ideas on the mechanism of microevolution brought him to the conclusion that microclines are a special form of adaptation. He paid great attention - and particularly in the last years of his life - to the development of the ideas on the taxonomic indivisibility of species, which he believed to be the final taxon.

P.V. Terentyev was a prominent and many-sided zoologist, his contribution to the science was very important, his approach to the solution of complex scientific problems was always original and creative. He was a gifted teacher and popularizer of science, the author of a number of excellent textbooks, of many popular-science papers and booklets discussion different topics. A splended lecturer and debator he often delivered lectures and addresses not only as an honoured University professor but also outside the walls of his "alma mater" to different audiences. His picturesque and interesting speech never left the hearers indifferent. Among his other important merits we should underline his work on science organization, for example the organization and carrying out in 1958-1964 of four very representative conferences in Leningrad on the problems of application of mathematics in biology. Two large herpetological conferences in Leningrad, in 1964 and 1967, which were held under his guidance, played an important part in the consolidation of Soviet batrachologists and herpetologists. Together with S.A. Chernov, P.V. Terentyev has been for a long time the recognized leader of the Soviet batracho-herpetology.

The important scientific merits of P.V. Terentyev were duly recognized by many scientific institutions and organizations. He was Fellow of the Leningrad Society of Naturalists and of the Moscow Society of Nature Investigators, Honory Member of the Herpetologists' League, Fellow of the American Society of Ichthyologists and Herpetologists, Fellow of the Society of of Evolution, and a corresponding member of the Polish Academy of Sciences. Herpetologists of all the world will forever thankfully remember this remarkable naturalist.

Leningrad State University and
Zoological Institute Akademy
of Sciences of USSR
Leningrad, USSR

RECENT DEATH

We hear, with great regret, that CHARLES E. SHAW, longtime Curator of Reptiles and more recently Assistant Director of the San Diego Zoo, died of cancer on 2 June 1971.

CURRENT HERPETOLOGICAL TITLES, XVI: 1970 - 1971

Herpetological Information Search Systems
American Museum of Natural History
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We have brought to your attention more than 13,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1970-1971) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be even more current. We hope that the added numbers will serve to reduce the titles-per-issue to a more manageable number.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 1 April through 21 May 1971. Periodical title abbreviations follow the American Standard for Periodical Title Abbreviations Z 39.5-1963 (American National Standards Institute, Inc., New York).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and L. Greene. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. Dr. Robert W. Winter provided us with translations of titles, abstracts and papers from Slavic languages. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 32 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

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1971 herpetologists' YEARBOOK

WITH A CALENDAR FOR 1972

PREPARED BY

The Genera of Reptiles Project
Department of Herpetology
The American Museum of Natural History
New York, N. Y. 10024

$15.00

HERPETOL REV 3(4): A

AUGUST 1971

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HERPETOLOGISTS' YEARBOOK

The HERPETOLOGISTS' YEARBOOK for 1971 is in preparation and will be issued in the fall of this year. The Yearbook is a new idea in the field. Besides reviewing the status of special subjects on amphibians and reptiles, it will provide basic data on the biology and classification of these animals. This information, culled from the material retrieved and consolidated by the Genera of Reptiles Project (HISS) at the American Museum of Natural History, will be consulted on almost a daily basis by anyone who is interested in amphibians and reptiles. This first annual issue will contain hundreds of important items of information on these animals. We expect future issues to grow into a regular almanac of herpetology.

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SOCIETY MEMBERSHIPS AND SUBSCRIPTIONS -- 1971

Though their numbers are increasing, it is still true that fewer than 60 per cent of the members of the HERPETOLOGISTS' LEAGUE belong also to the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES. And less than two-thirds of the members of the latter society also belong to the Herpetologists' League. We believe that each of the societies has something important and unique to offer the members of the other. In the interests of a greater combined membership of persons interested in amphibians and reptiles, we invite the members of each society to also join the other.

To ease this process, we offer the "easy-form" membership applications below.

THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

This young society (a 1967 outgrowth of the OHIO HERPETOLOGICAL SOCIETY) offers a number of different publications on amphibians and reptiles.

Its regular publications include the semi-annual JOURNAL OF HERPETOLOGY (about 200 pages per year), the bi-monthly HERPETOLOGICAL REVIEW (about 225 pages per year), and a series of FACSIMILE REPRINTS IN HERPETOLOGY, which is now devoted to reprints of G. A. Boulenger's contributions to American herpetology (about 100 pages per year). In 1971 the Society also assumed sponsorship of the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES. Besides these publications, the Society issues a number of SPECIAL REPRINTS each year (see the back of this page for examples).

Membership is open to anyone interested in amphibians and reptiles. All classes of members receive the J HERPETOL, HERPETOL REV, regular issues of FACSIMILE REPRINTS, and all have the same membership privileges. The higher classes of membership aid the Society in improving and expanding its services to its members and to the field of herpetology.

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The Herpetologists' League is the elder and the larger of the two societies. It was established in 1936, when the journal HERPETOLOGICA (now in its 27th Volume) began publication.

HERPETOLOGICA appears quarterly, and will publish some 500 pages of papers on amphibians and reptiles this year. By arrangement with the SSAR, the Members and Fellows of the League also receive HERPETOLOGICAL REVIEW, beginning this year.

Anyone with an interest in herpetology is eligible for membership in the Herpetologists' League. The Fellows, who hold the voting rights in the League, are elected by the Executive Council, "on the basis of their contribution to the science of herpetology."

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ANNUAL MEETING
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Populations of the salamander Desmognathus ochrophaeus inhabiting wet, vertical rock faces in the vicinity of Mt. Mitchell, North Carolina were sampled and information on size and age at maturity was compiled. Site at maturity was found to increase with increasing elevation and smaller size than individuals inhabiting rock faces at 5025 and 3550 feet elevation yielded sample sizes sufficient to permit determination of age at maturity and juvenile growth rates for two populations. In the population above 3550 feet elevation, which in turn are attained by delaying sexual maturity about one year relative to its occurrence in the lower population. The juvenile growth rates of the two populations are similar to one another and to those estimated for nearby woodland populations.

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Make the abstract self-contained, since it must be intelligible without further information. Be concise without being obscure; retain the basic information and tone of the presentation.

Write most abstracts in a single paragraph. Normally employ complete, connected sentences, active verbs, and the third person. Use nontextual material such as short tables and structural formulas only when no acceptable alternative exists. Employ standard nomenclature, or define unfamiliar terms, abbreviations, and symbols the first time they occur in the abstract.

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KARYOTYPIC VARIATION AND RELATIONSHIPS OF THE CALIFORNIA LEGLESS LIZARD ANNIELLA PULCHRA GRAY (REPTILIA: ANNIELLIDAE)

Robert L. Bezy & John W. Wright

Three taxa (Anniella p. pulchra, A. p. nigra, and A. geronimensis) are currently recognized in the family Anniellidae (Wermuth, 1969). We here report karyotypic differences between populations of A. p. pulchra and A. p. nigra, and discuss the relationships of the family Anniellidae as suggested by karyotype information.

MATERIALS AND METHODS:

Chromosomes were prepared by a colchicine, hypotonic citrate technique (see Lowe, Wright, and Cole, 1966) from 10 Anniella p. pulchra (6 male, 4 female) collected in the sand dunes of El Segundo, W. of Los Angeles International Airport, Los Angeles Co., California (LACM 64574-83) and 7 A. p. nigra (4 male, 3 female) collected at Asilomar, S. of Point Pinos, Monterey Co., California (LACM 63584-91). Most of the tissue samples were heterogeneous, and sources included spleen, small intestine, kidney, ova, and testes.

The karyotype described for A. p. pulchra is the modal condition seen among 189 (61 male, 128 female) mitotic metaphase spreads; that for A. p. nigra is based on 128 (65 male, 63 female) cells. At least 10 cells were studied from each of the 17 individuals, except for A. p. pulchra from which only 1, 2, and 6 cells were examined.

In counting the number of chromosome arms (n.c.a. or c.a.), only acrocentrics (A) were considered uni-armed, while metacentrics (M), submetacentrics (SM), and subtelocentrics (ST) were considered bi-armed, regardless of whether they were macrochromosomes (macros) or microchromosomes (micros).

KARYOTYPE DESCRIPTIONS:

The karyotype of the population of Anniella p. pulchra has a diploid chromosome number (2N) of 20, consisting of 8 pairs of macros and 2 pairs of micros (Fig. 1A). The macros fall into two fairly discrete size classes, each containing four pairs. The centromere positions of the 10 pairs of chromosomes (numbered from largest to smallest, as in Fig. 1A) are: 1, SM; 2, SM to ST; 3, SM (nearly ST); 4, ca. M; 5, A; 6, ST; 7, SM; 8, A; 9, A; 10, SM. The n.c.a. in this karyotype is 34.

All 7 specimens from the population of A. p. nigra have a 2N of 22, consisting of 16 macros and 6 micros (Fig. 1B). This karyotype differs from that of A. p. pulchra in that chromosome pair 5 is clearly ST rather than A, and there is an additional pair of micros (the smallest pair in the complement) which is A. The n.c.a. in this karyotype is 38.

DISCUSSION:

Anniella nigra was described by Fischer (1885) on the basis of a specimen thought to have been from San Diego, California, and said to differ from A. pulchra in having a darker dorsum, shorter tail, and longer preanal scales. Currently, nigra is considered a subspecies of A. pulchra occurring primarily on the Monterey Peninsula (Stebbins, 1966) and intergrading with A. p. pulchra along the coast of California, both to the south (Grinnell and Camp, 1917; Klauber, 1940) and the north (Miller, 1943).

One pericentric inversion and a loss (or gain) of a pair of micros is required to explain the karyotypic differences observed between the population of A. p. pulchra and that of A. p. nigra. In general, karyotypic differences of this magnitude have been found only between species or higher taxa. The taxonomic significance of these differences is tempered, however, by the report of Cole (1970) of somewhat comparable interspecific geographic variation in chromosome number and populational polymorphism in chromosome morphology in species of Sceloporus.

For the present, we consider the presence of pair 11 and the A condition of pair 5 to be the primitive karyotypic states in Anniella pulchra. From this hypothetical ancestral karyotype, that of A. p. nigra can be derived by a pericentric inversion (pair 5: A→ST), and that of A. p. pulchra by the loss of pair 11. The short arms of pair 6 appear slightly longer in A. p. pulchra, than in A. p. nigra, (Fig. 1), suggesting that a transfer of chromatin (via whole arm translocation) from pair 11 to the short arms of pair 6 may have preceded centromeric loss.

We intend to study further the morphological and karyotypic variation of lizards of the genus Anniella with emphasis on the reported areas of intergradation (A. p. pulchra x A. p. nigra) and sympatry (A. geronimensis and A. p. pulchra; Stebbins, 1954: 303). It is hoped that study of meiosis in "intergrading" populations may yield information on: (1) the homologue in A. p. pulchra of chromosome pair 11 of A. p. nigra; and (2) reproductive potential of hybrids (intergrades).

Matthey (1931) reported a specimen of "Aniella pulchra" from California as having a diploid chromosome number of 24 consisting of 4 very large V's, 4 large V's, 2 long rods, 6 short rods, and 8 very short round chromosomes. This suggests that a third karyotype may occur in Anniella pulchra.

When Gray (1852) described the genus Anniella, he placed it in the family Scincidae. Cope (1864) erected the then monotypic family Anniellidae which he considered closely related to the Scincidae. In his now widely accepted classification of lizards, Camp (1923) considered the anniellids to be closely related to the anguids. McDowell and Bogert (1954: 124) noted numerous osteological similarities between Anguis and Anniella, but chose to maintain the family Anniellidae because of its several peculiar skull modifications.

With the chamaeleontid Rhampholeon spectrum (see Matthey, 1957), Anniella p. pulchra shares the dubious distinction of having



FIG. 1. Karyotype of two populations of Anniella pulchra. A. A. p. pulchra (LACM 64583, ♂). B. A. p. nigra (LACM 64585, ♀). Lines equal 10 micra.

the lowest 2N (20) reported for lizards. The low chromosome numbers (20-22) combined with a moderately low n.c.a. (34-38) makes the karyotype of A. pulchra difficult to derive from that reported for any other group of lizards. This tends to strengthen the view that the degree of evolutionary divergence attained by Anniella is of a familial rank.

Published anguid chromosome numbers range from 30 (18 macros and 12 micros) to 48 (22 macros and 26 micros; Bury, Gorman, and Lynch, 1969). Karyotype studies of the junior author indicate that the n.c.a. in anguids ranges from ca. 40 to over 50. The anniellid-like Anguis fragilis has a 2N of 44, with 20 macros, 24 micros, and 48 c.a. (Margot, 1946). Because the karyotypes of anguids have higher numbers of chromosomes and chromosome arms, derivation of the Anniella karyotype requires many fusions (or chromosome losses) and pericentric inversions.

Scincid lizards on the other hand have lower chromosome numbers. Six New World species have a 2N of 26 (with 12 macros, 14 micros and 52 c.a.; DeWeese and Wright, 1970), while Old World skinks have been reported to have a 2N ranging from 24 (14 macros and 10 micros) to 32 (32 macros and 0 micros) with at least 36-46 c.a. (see Dutt, 1969). Resolution of centromere positions for micros of Old World skinks may increase this estimate of n.c.a. More recently, we have examined material which indicates that at least one species of the limbless acontine skinks has an even lower 2N (22, with 12 macros, 20 micros and 44 c.a.). Whether the similarities in chromosome number and in life-form between acontine skinks and anniellids indicate a phylogenetic relationship or the combination of morphologic and karyotypic convergence is a question requiring further study of both chromosomal and morphological evolution in these families. Certainly, their differences in both the number of chromosome arms and the relative numbers of macros and micros, indicate that at least some convergence (or parallelism) is responsible for their karyotypic similarity.

In the foregoing discussion, we have used the hypothesis that among lizards centric fusion rather than fission is the predominant mechanism of change in chromosome number. Although centric fission would reverse evolutionary directions, the relationships would remain constant. However, the specialized life-forms of acontine skinks and anniellids suggests that their low chromosome numbers are also derived (rather than primitive) states and that centric fusions (rather than fissions) are involved. We have discussed only those families (Anguidae and Scincidae) which have, on morphological grounds, been considered to be closely related to anniellids. The low chromosome numbers of the chamaeleontid Rhampholeon spectrum (see Matthey, 1957) and of five species of the spinosus group of Sceloporus (see Cole, 1970) we consider to be other examples of reductions in chromosome number that have occurred in other groups of lizards.

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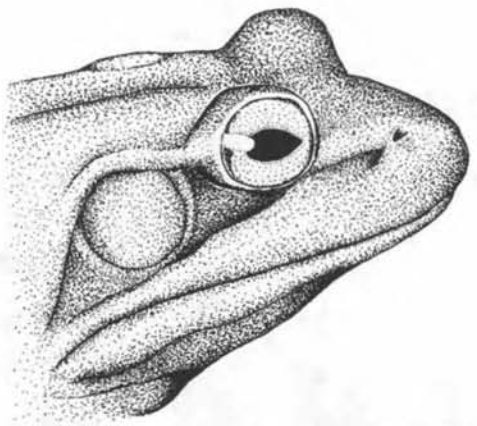
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RANGE EXTENSIONS FOR GEORGIA AMPHIBIANS AND REPTILES

Charles H.Wharton & J.Donald Howard

Because details of the distribution and habitat of our herpetofauna are needed, we have documented range extension records supported by specimens from several institutions (abbreviated below). Unless otherwise noted, references to published ranges are those from Conant (1958, A Field Guide to Reptiles and Amphibians, Houghton Mifflin Co.) and Martof, (1956, Amphibians and Reptiles of Georgia, University of Georgia Press).

We wish to thank the following individuals for their assistance: Gerald Williamson, Savannah Science Museum (SSM); Lloyd Newberry, Armstrong State College; G. William Dopson, Jr., University of Georgia (UG); Susan Howard, Carol Wharton, and Tom French, Georgia State University (GSU); and William Leach for permission to publish information on his Floyd County cottonmouths.

Ambystoma talpoideum -- The range of the mole salamander is given as the entire Georgia Coastal Plain. The only Piedmont record is claimed by W.T. Neill (1947, COPEIA 4: 271-272, PUBL ROSS ALLEN'S REPTILE INSTITUTE 1(7): 75-96) who refers to an adult from Richmond County, 4 miles west of Augusta. We have taken 4 adults (GSU 1505, 22 Sept. 1970; GSU 1560, 3 Nov. 1970; GSU 1161, 12 July 1970; GSU 1664, 19 Jan. 1971) and one larva (GSU 1124, 14 June 1969) from the swamps of the Alcovy River, near Covington, Newton County, extending the range 130 miles WNW into the central Piedmont. The mole and the spotted salamanders (A. maculatum) are apparently not randomly distributed in an individual riverine swamp, but occur in relatively circumscribed "colonies."

Notophthalmus perstriatus -- Conant and John S. Mecham (1967, CAT AMER AMPHIB REPT) restrict the striped newt to southern Georgia west of a line between the Okefenokee (Charlton County) and Abbeville (Wilcox County). Gerald Williamson located a colony in a borrow pit in Bryan County close to the east side of the Ogeechee River. On 20 November 1970, with Williamson, we took 18 specimens (GSU 1607) from the submerged grass in the shallow pit in low sandhill country with scattered cypress ponds, extending the range 95 airline miles NE.

Desmognathus aeneus aeneus -- The Cherokee salamander is normally a montane form in Georgia. In the more southern Georgia mountains we have taken a number in Union County (GSU 74, 372, 724, 777) and Lumpkin County (GSU 40), and Gerhardt took it in Union County (SSM 69.1270) and Dawson County (SSM 69.1260) at altitudes approximately 3000 feet. W.T. Neill (1954, PUBL RES DIV ROSS ALLEN'S REPT INST 1(7): 75-96; COPEIA 1957(1): 43-47) summarized other records. Conant's range map suggests a continuous distribution between the Georgia Blue Ridge and its extension into Alabama. Several trips by the junior author appear to verify this. Three specimens (GSU 514) from Pine Log Mountain, Bartow-Cherokee County line, have typical Cherokee head patterns while a fourth (GSU 633) 1.5 miles E., has straight-edged, dorso-lateral lines, and a herringbone dorsal pattern as well. Another specimen (GSU 1011) from 60 airline miles SW Pine Log (Mount Zion, Carroll County) is similar, but lacks a herringbone pattern and has a nearly continuous dorsal median stripe. Two specimens (GSU 1175) from 5 miles SW Heflin, Cleburne County, Alabama, appear typical aeneus aeneus. Mount and Folkerts (1968, HERPETOLOGICA 24(3): 259-262, have a series (Auburn U. 6800-05) from 2.5 miles W Heflin. These localities are within or close to the Alabama extension of the Blue Ridge province as outlined by Duncan (1967, SIDA CONTRIB BOTANY 3(1): 76).

Pseudotriton montanus montanus -- The eastern mud salamander occurs in the eastern half of the Georgia Piedmont. There are 10 specimens from the Sandy Creek Swamp 3 miles N Athens, Clarke County (SSM 65.514, 69.793, 69.794). Our records suggest that it occurs W to Chattahoochee River. In support of this is a marginal record from the Alcovy River Swamps (GSU 1200 (1), 14 Oct. 1969), 3 specimens (GSU 987, 20 March 1969) from Morning Creek near Fayetteville, Fayette County and one specimen (GSU 971, 18 Jan. 1969) 11 miles SW Atlanta, Fulton County. There is one specimen (UG 398) from East Point, Fulton County.

Scaphiopus holbrooki holbrooki -- The spadefoot is supposedly absent from the Georgia Piedmont except from a tier of counties adjacent to the Fall Line in Hancock, Warren, McDuffie, Columbia and Lincoln Counties, where it was recorded by Neill (1957, ibid). There is a specimen (UG 661, 4 June 1959) from Greene County, in the next tier of counties northward. In February and March of 1966 Carl Gerhardt and Lloyd Newberry took a number of specimens (SSM 66.561 (3), 69.1242 (1)) breeding in ditches along the railroad track at Athens, Clarke County, following a heavy rainstorm.

Three additional specimens have been taken midway between the SE Piedmont records and the Ridge and Valley province in Gwinnett (GSU 700, May 1967), Fulton (GSU 942, 26 July 1967) and Douglas (GSU 461, 21 June 1965) counties. The Gwinnett and Fulton specimens were taken from sandy, alluvial soils of the Chattahoochee floodplain. The spadefoot's digging requirements may limit it to such environments in the Georgia Piedmont.

Hyla cinerea cinerea -- The green tree frog is usually considered to be a coastal plain species. There are 3 records for the Georgia Piedmont known to us. S. Lloyd Newberry (pers. comm.) encountered a huge breeding colony near Parkhaven, Jones County. Carl Gerhardt took 10 specimens calling at Clark Hill Reservoir, McDuffie County, at U.S. Highway 78 (SSM 69.1127, 19 June 1966). The most notable Piedmont record, however, is a series from a breeding colony 4 miles SE Greenville in Meriwether County, discovered by Carol Wharton (GSU 1489, 14 Aug. 1970 (4)).

Sternotheraerus minor minor -- The loggerhead musk turtle inhabits the southern portion of the Georgia Piedmont. Gilbert Helmken took a specimen (SSM 61.222) at Warm Springs, Meriwether County and we have 2 specimens (GSU 183, 22 July 1961) from 2 miles W Milner, Lamar County. Both of these are marginal records. Two specimens, (GSU 1510, 16 Aug. 1969), however, from the Alcovy River, Newton County, appear north of the published range.

Kinosternon bauri palmarum -- The striped mud turtle is unreported from coastal Georgia counties. We have one specimen (GSU 1300, 2 May 1970) from the coast, 3 miles NW Cox, McIntosh County, taken while crossing a narrow sandhill separating the Altamaha River Swamp from a cypress pond.

Clemmys guttata -- The range of the spotted turtle is the extreme eastern coastal plain border. Marginal records include a Candler County specimen (GSU 1603, 24 May 1970) from Stockinghead Creek Swamp, Metter, Georgia, and one (SSM 71.1623) taken 4 Sept. 1970 by Lloyd Newberry crossing State Highway 46, 3 miles E U.S. 1 near a big swamp bordered by sandhill-turkey oak, Emanuel County. A Twiggs County specimen (GSU 1584, 1 May 1970) was taken by the author and Zoology 445 class crossing Highway 129, 75 meters S of Shellstone Creek, extending the range 100 miles W.

Two spotted turtles were collected by Gerald Williamson sunning on a log in Effingham County. We visited this locality in November 1970. It is on a small tributary of the Ogeechee bordered by sand hill scrub. There was no moving water and the swamp floor was heavily silted. The Ogeechee lime (Nyssa ogeche) was the dominant tree.

Ophiosaurus attenuatus longicaudus -- The eastern slender grass lizard is unrecorded from the Blue Ridge province. We have a specimen (approximately 11.5 inches snout-vent length), (GSU 49A, 5 Sept. 1959) from Denton Creek at its junction with the Tallulah River 18 miles NW Clayton, Towns County, in an isolated mountain valley deep within the Blue Ridge.

Natrix taxispilota -- The brown water snake ascends some Piedmont rivers. We have found it on the Flint, Ocmulgee and Oconee River systems. In 1940 I took a specimen below the mill dam at Milstead on the Yellow River, Rockdale County, the northern-most locality in the Atlanta vicinity. The most northerly Georgia record is from the Oconee River at Athens, Clarke County where Lloyd Newberry (pers. comm.), in 1965, captured several at night. In the southern Piedmont Mount and Schwaner (1970, HERPETOLOGICA 26: 76-82) list one specimen on a Chattahoochee tributary 6.1 miles E West Point

(AUV 6616) and Carl Gerhardt took one at the U.S. 78 bridge over Clark Hill Reservoir 19 June 1966 (SSV 69.1068).

This snake is common in beaverponds along the Flint River 15 miles S Atlanta (GSU 872 (3), 985 (1), 1006 (1)). One specimen (GSU 1511) is from Hard Labor Creek, Morgan County. Although this snake is normally a lover of quiet water, two immatures (GSU 1509) were collected by Tom French at White Shoals, Alcovy River, Newton County.

Elaphe obsoleta spiloides -- The grey rat snake ranges E to Central Echols County. We were surprised to capture two grey rat snakes in and near the Okefenokee Swamp, which is well within the narrow coastal range of the yellow rat snake (E. o. quadrivittata). One of these (GSU 87, 7 May 1960) was taken on a brush pile between Billie's and Minnie's Lakes, Charlton County and the other (GSU 946, 2 Dec. 1968) was taken at Fargo, Clinch County. It appears that this subspecies ranges from the Valdosta uplands through Fargo and up the peninsula of land (followed by State Road 177) to Billie's Lake near the center of the Okefenokee.

Cemophora coccinea -- The scarlet snake is rarely encountered in the Georgia Piedmont and is apparently absent from the mountains of the Blue Ridge. One reason may be the lack of connected deposits of sandy soils suitable for burrowing. There is a specimen (SSM 69.661) from a sandy road found by Otis Beauchamp in Banks County, near the headwaters of the Broad River. We have a specimen (GSU 198, 22 Dec. 1959) unearthed by bulldozer in a stream valley near Clayton, Rabun County, well within the Blue Ridge province.

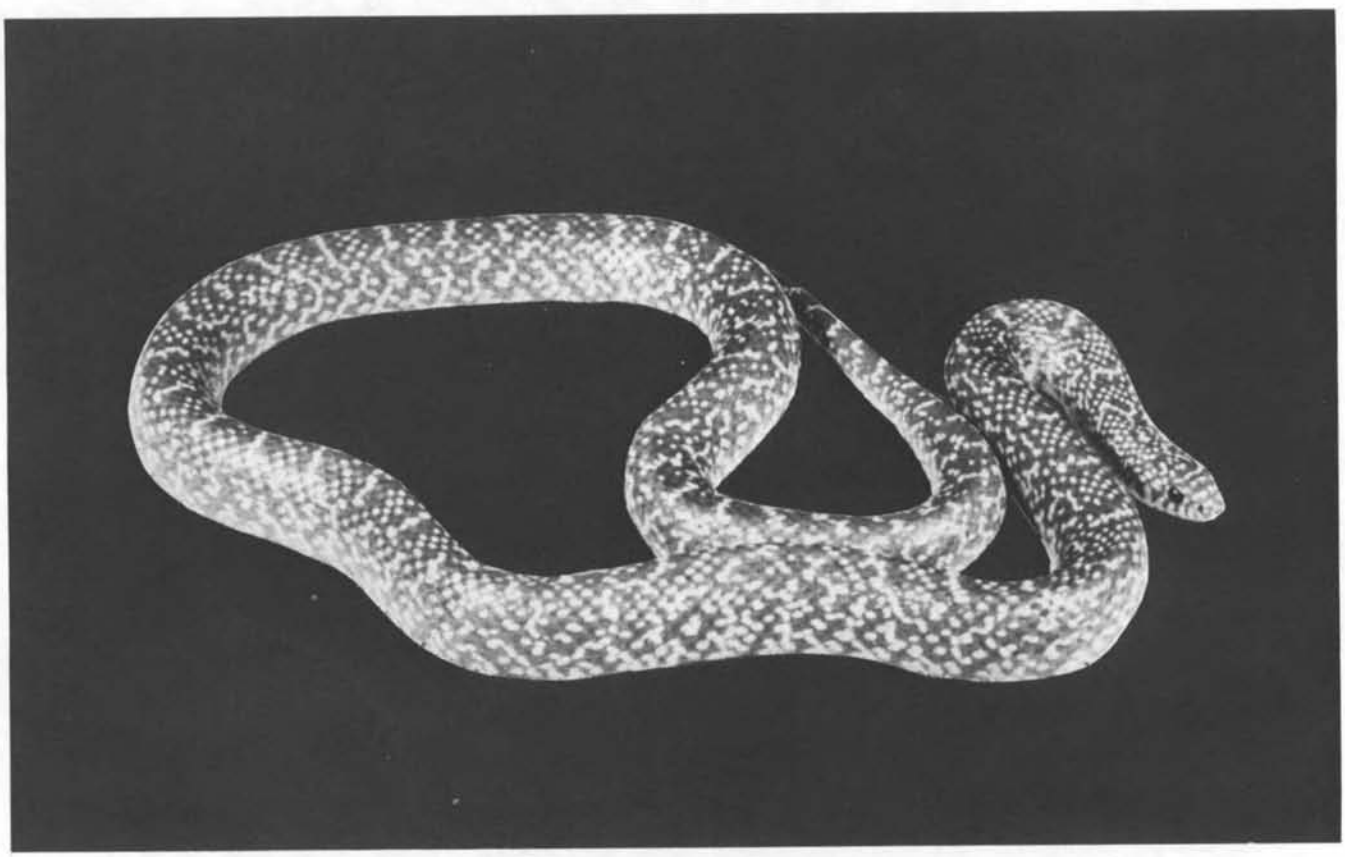
Agkistrodon piscivorus -- For 30 years we have traced numerous false reports of cottonmouths in Georgia N of the Fall Line. Reliable reports indicate circumscribed and widely-separated pockets in the Piedmont. Neill (1947, HERPETOLOGICA 3: 203-205) has reported an isolated population in the swamps of Dry Fork Creek, Ogelthorpe and Wilkes Counties. There is also a specimen (UG 721) collected by Jack Connel 14 April 1951 from Fishing Creek, Wilkes County, the next major Savannah tributary SE.

On 7 August 1970, Carol Wharton collected a DOR cottonmouth on Ga. 18, 4 miles SE Greenville in Meriwether County. We visited this locality on 24 October. A long-time resident confirmed the presence of the cottonmouth on this tributary of Walnut Creek. Heavily cut-over and beaver pruned, the swamp supports a sweet gum (Liquidamber styriciflua), black gum (Nyssa sylvatica), sweet bay (Magnolia virginiana) complex, the latter forming nearly pure stands in places.

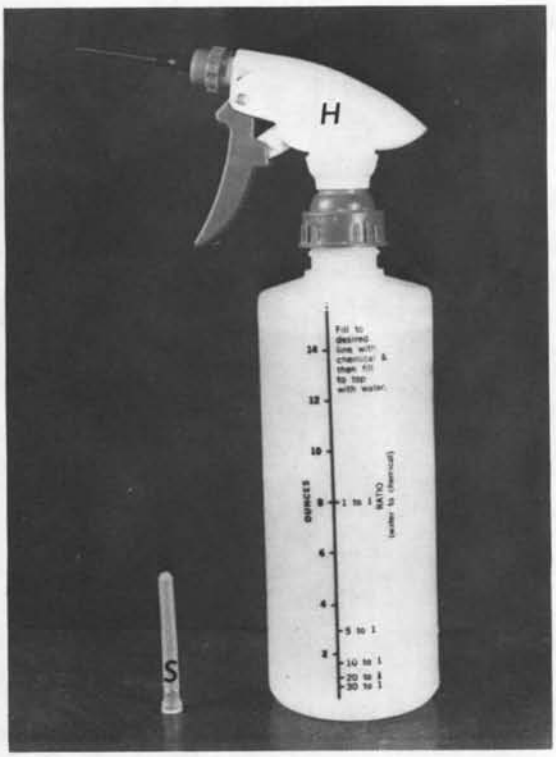
One of the most remarkable occurrences in northern Georgia is a concentration of cottonmouths on the Coosa River (elev. 600') and its coldwater tributary, Cabin Creek, Floyd County. The snakes were first reported by Noland Hess. Subsequently, J. William Leach (pers. comm.) took 40 specimens from Coosa River flood plain ponds near Rome, Georgia. Careful investigation by Leach of the Coosa River for 50 miles, and of streams both east and west indicate two localized pockets 15 miles apart. Three Floyd County specimens are at Georgia State (GSU 1608 (2), GUS 1609 (1)), 3 are in Leach's possession and 4 are at Shorter College.

We have a cottonmouth (GSU 48) from Annewakee Creek, Douglas County, .5 miles from its junction with the Chattahoochee. Several night collecting trips on Annewakee and nearby Bear Creek and Dog River failed to turn up other specimens. Since the Chattahoochee does not afford much typical habitat we conclude that this specimen was an introduction.

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An amelanistic specimen of Lampropeltis getulus holbrooki. This unusual specimen from Baton Rouge, E. Baton Rouge Parish, Louisiana, is typically patterned with yellow spotting, but the normally black ground color is a very light yellowish tan. The absence of black pigment is also noted in the red eyes and tongue.
Richard M. Blaney (Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70803



UNREVIEWED-UNEDITED COMMUNICATIONS

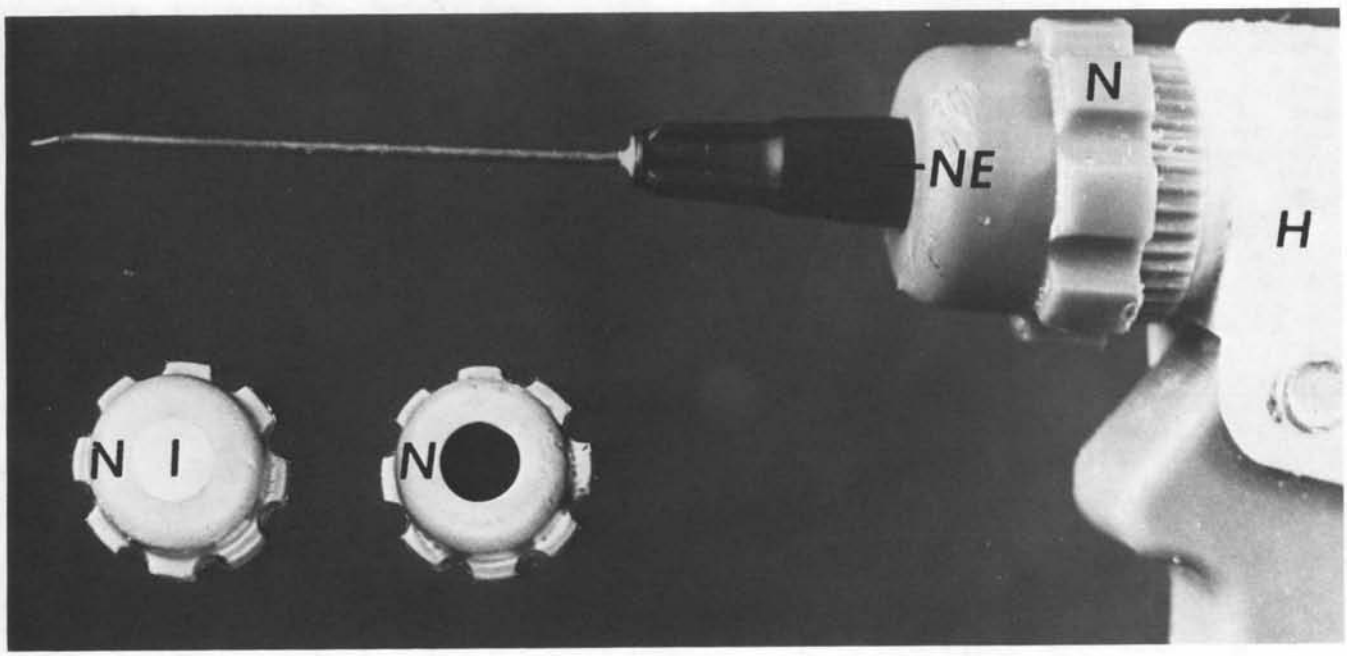
A NEW "SYRINGE" FOR INJECTING HERPTILES

Morris K. Jackson

The injecting of herptiles with a syringe and a hypodermic needle is often messy, time consuming, and, generally, objectionable. As a result, I have devised a simple inexpensive instrument which might be of some value to herpetologists. The "Grizzly (G) syringe" is a modified janitorial spray gun which has been adapted to a hypodermic needle (Fig. 1). The G-syringe, being constructed of unbreakable polyethylene, is light weight, non-leaking, and equipped with a volumetric scale which aids in preparing different concentrations of fixative. Assembly of the G-syringe is simple (Fig. 2): (1) remove nozzle (N) from head (H); (2) punch out plastic insert (I) from center of nozzle; (3) insert the hypodermic needle (NE) in the hole; and (4) replace nozzle on head. To be safe, replace protective sheath (S) on the hypodermic needle when not in use. Chlorox jugs and similar containers can also be used when greater volumes of fixative are needed.

I wish to thank Dr. Harley Reno and Miles L. Cook for assistance in this manuscript.

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UNREVIEWED-UNEDITED COMMUNICATIONS

THE EGG-ALGA RELATIONSHIP IN AMBYSTOMA T. TIGRINUM

James D. Anderson, Dawn D.Hassinger and George H. Dalrymple

[In his covering letter for this article, Dr. Anderson states, "I have been concerned for some years that everyone assumes that this "symbiotic" relationship is beneficial to salamander development. My field experience always indicates that it is at best a fortuitous relationship and might even be detrimental under certain conditions in the field. I felt therefore that this should reach the people who might be making similar observations but ignoring them. Hopefully, it will also stimulate people to report the presence of the alga in various other species. I am convinced that it is not universally present, but unless people report the situation in their natural history papers, we really don't know." This introduction to the problem seems appropriate for the audience to which HERPETOLOGICAL REVIEW is addressed. -- Ed.]

In a series of laboratory studies, Gilbert (1942, 1944) reported higher survival, more rapid rate of development and larger size at hatching in eggs of Ambystoma maculatum harboring the green alga Oophilla amblystomatis. Lardner (pers. comm.) suggested that the symbiont was Chlamydomonas and indicated its occurrence in several species of amphibians. Although Gilbert (1944) and others reported a high incidence of the alga in A. maculatum masses in the field, there are no field studies indicating the degree of infestation, seasonal changes or benefits in a natural population.

During the winter and spring of 1969 we recorded the presence or absence of the alga in all egg masses (265) deposited by an isolated deme of Ambystoma t. tigrinum near Heislerville, Cumberland County, New Jersey. Three ponds (designated Front, Middle and Back) contained 234 masses, and 31 others were scattered in 6 other ponds. On three dates, between deposition and hatching we also determined stage of development and mortality in the masses and could therefore correlate frequency of infestation with the following: stage of development, pond, date, and mortality. Hassinger et al. (1970) described the life history and the habitat for this population and Anderson et al. (1971) discussed mortality in eggs and larvae during 1969.

The per cent frequency of algal infestation increased with the season and varied slightly between the three major ponds (Table 1). Both variations may be temperature effects. Middle pond thawed first but front pond was the shallowest and warmest as the season progressed. Prior to gastrulation the alga was absent (or at least not visible to the naked eye) but increased in frequency in subsequent developmental stages (Table 2; for a comparison of field designated stages with standard Harrison stages, see Hassinger et al. 1970). We also found a strong correlation between mortality and the presence of the alga. At any date all masses having zero mortality contained no algae and 97 per cent of masses with all eggs dead contained algae. Moreover, within a given stage of development (neurula) on a single date approximately half (49.2%) the eggs in masses containing the alga were dead whereas slightly more than a third (39.7%) were dead in masses without algae.

We noted no differences in rate of development or size of embryos in masses with or without algae. Thus we found no beneficial effects from the egg-alga relationship and in fact found a consistent correlation of the alga with higher mortality. From these field studies we were unable to determine whether the alga increased mortality or increased mortality enhanced conditions for the alga. The benefits demonstrated by Gilbert (1944) for A. maculatum eggs in the laboratory are not reflected in this field study on A. tigrinum.

Table 1. Percentage of egg masses harboring the symbiotic alga Chlamydomonas sp.

	28 January	15 February	9 March
Front	28.6	62.5	100
Middle	55.1	66.7	85.0
Back	23.3	86.7	86.9
All ponds	35.7	72.0	89.1

Table 2. Percentage of masses containing Chlamydonas at different stages.

Stage	% masses
cleavage	0
Blastula	0
Gastrula	12.5
Neurula	56.7
Tail Bud	76.3
Larval	97.1
Near Hatching	100

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UNREVIEWED-UNEDITED COMMUNICATIONS

ESTIMATING LIZARD HOME RANGES

Frederick B. Turner

Milstead (1971) has commented on the simplicity of estimating home ranges of lizards occupying essentially plane surfaces, suggesting that there is no more to the task than drawing lines connecting various capture loci and determining the areas of the resulting polygons. I think there is considerably more to be said about this problem. I will comment first on the technical aspects of estimating home ranges, and secondly on the more general question of why home ranges should be measured at all.

To begin with, polygons based on recapture data can be drawn in a number of ways. One way is to connect the points so that the boundaries of the resulting polygons are not indented (convex polygons). Another method permits concavities in the boundaries of the polygons (minimum polygons), but with typical dispersions of capture loci many possible polygons can be constructed in this manner. More important is the sample size bias suffered by both polygon techniques. As more capture points are accumulated the animal's home range appears to become larger. This effect diminishes as the number of capture loci increases. Hence, the common practice of analyzing only home range data contributed by those individuals captured an arbitrary minimum number of times. If these problems have been recognized in the past, it is not apparent in the bulk of the literature pertaining to lizard home ranges. Both techniques have been employed, and the sample size bias either swept under the table or ignored. In my view, most of the home range data published for lizards are of little meaning as they stand.

Some improvement has been effected by the adoption of methods without sample size bias (Calhoun and Casby, 1958; Jennrich and Turner, 1969). The older of these techniques estimates circular home ranges, the radii of which ("recapture radii") are estimated from the dispersion of capture loci. Home range estimates derived in this manner are not biased by sample size, but are biased if the home range is not really circular. The first use of this method with lizard data was by Jorgensen and Tanner (1963). Tinkle later used this technique and 1) confirmed empirically the absence of sample size bias, and 2) discovered that home range estimates predicated on polygons were much smaller than those estimated from recapture radii (Tinkle, 1967: 98). However, if polygon estimates are corrected for bias, and if the home ranges are really circular, estimates derived by the two methods are similar (Jennrich and Turner, 1969; Turner et al. 1969).

It would obviously be advantageous to escape the restriction of circularity imposed by the Calhoun and Casby method, and this may be done using a technique based on the determinant of the covariance matrix of the capture loci (Jennrich and Turner, 1969; Mazurkiewicz, 1969). This method estimates elliptical home ranges (or circles, if both axes are identical), and in a manner free of sample size bias.

One difficulty not yet faced by those using either recapture radii or ellipses is that both of these methods assume bivariate normal distributions of activity. With the Calhoun and Casby method the bivariate distribution must also be circular. In either case the underlying probability distributions assume diminishing frequencies of utilization with distance from the home range "center." Perhaps some lizards actually distribute their spatial utilization in this manner. However, it is unlikely that strongly territorial lizards use their available space in this way. I do not know what the utilization distribution would look like, but it would almost certainly involve relatively higher probabilities of occurrence at the home range periphery. A tendency in this direction would be represented by a uniform distribution involving equal utilization of all parts of the individual's range. The same problem would arise in examining the apparent home ranges of animals occupying an enclosure if their activities brought them into frequent contract with the fence. The circular and elliptical methods of estimating home ranges are statistically pleasing in their lack of sample size bias, but they are realistic only to the extent that the assumed utilization distributions (bivariate normal) conform to reality. The nature of these distributions has never been investigated with lizards.

Why do we measure the home ranges of lizards? What questions are involved? By and large, the home ranges of lizards have been measured simply "because they are there." But these estimates need to contribute to the solution of some specific problem, or to the understanding of particular ecological processes. The relationship of home range size to energy requirements has been questioned by McNab (1963) and Schoener (1968), and while one may not wish to view these papers as definitive they certainly have the merit of posing a question which seems susceptible to testing. It has been suggested by White (1964) that home ranges may fluctuate inversely with population size, and Tinkle's data on male Uta seem to support this idea (Tinkle, 1967). Whether this is true among non-territorial lizards has not been explored to my knowledge. If these questions are not appealing, others undoubtedly exist (e.g., see Siniff and Jessen, 1969). In any event it seems to me that the questions to be posed and the techniques devised to answer them have progressed beyond the simple use of scissors and paper.

I thank Robert Jennrich for several clarifications of the text.

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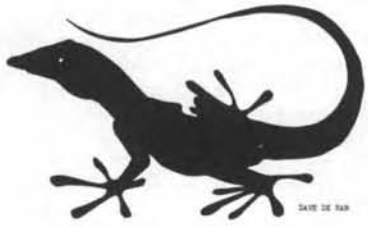
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CARIBBEAN

RESEARCH

Fairleigh Dickinson University has announced the opening of a WEST INDIES LABORATORY on St. Croix, U. S. Virgin Islands. The multidisciplinary laboratory occupies an eight acre tract facing Tague Bay. Facilities include teaching laboratories and classrooms, research laboratories, darkroom, chemical storeroom, library, cold-storage room, outdoor saltwater aquaria, and fish pens. During the first summer session (18 July to 21 August) courses in marine ecology, marine invertebrate zoology, geological oceanography, and marine organisms and sediments will be offered. The second summer session schedule (22 August to 11 September) includes a course in terrestrial ecology of tropical vertebrates. The laboratory facilities are available to visiting groups and independent investigators, by application to Dr. H. Gray Multer, West Indies Laboratory, Fairleigh Dickinson University, Madison, New Jersey 07940.

JOS. J. SCHALL (Department of Zoology, University of Rhode Island) is planning to conduct a field study of Cnemidophorus lemniscatus arubensis on Aruba, Netherlands Antilles. He will be in the field from September 1971 through January 1972, and plans to concentrate on factors influencing the local distribution of the species on Aruba.

CHAIM KROPACH (Queens College, N.Y.) has completed a year's field study of the seasnake, Pelamis platurus, in the Gulf of Panama. Among other things he studied the food habits and feeding behavior, reproductive biology and population structure, relative densities and distribution in Panama Bay, and the effect of this snake on economically-important marine species. He also evaluated the danger of this snake to man.

The study is to be used toward fulfilling the requirements for a Ph.D. degree. It was supported in part by the Smithsonian Research Foundation and the Society of the Sigma Xi.

MEETINGS AND SOCIETIES

CALENDAR 1971

19-22 August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Univ. New Mexico, Albuquerque (cosponsored by the HERPETOLOGISTS' LEAGUE).

29 August - 4 September....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Colorado State Univ., Fort Collins.

1-4 November....SOCIETY OF VERTEBRATE PALEONTOLOGY, Annual Meeting, Washington, D.C. (with GSA).

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Philadelphia (with AAAS; cosponsored by the SSAR).

CALENDAR 1972

June.....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Boston.

July.....SALAMANDER SYMPOSIUM, Highlands Biological Station, North Carolina.

October...Combined Meeting: HERPETOLOGISTS' LEAGUE AND SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, University of Oklahoma Biological Station, Lake Texoma.

INDIVIDUALS AND INSTITUTIONS

The private herpetological collection of COLEMAN J. GOIN has been deposited in Carnegie Museum, Pittsburgh, Pa. This collection consists of over 850 frogs, principally from Colombia, Suriname, Bolivia, Venezuela, and other parts of South America. Included are numerous specimens reported in "Frogs of Colombia" and in a forthcoming review of the tree frogs of Suriname (Annals of Carnegie Museum, in press). The collection also contains type-specimens of several species described by Cochran and Goin in "Frogs of Colombia."

ROGER CONANT (Philadelphia Zoological Gardens) received an honorary doctorate (ScD) from the University of Colorado at its Spring Commencement.

MARLIN PERKINS (St. Louis Zoological Gardens) received an honorary doctorate from the University of Missouri.

DAVID B. WAKE (U. California, Berkeley) will become Director of the Museum of Vertebrate Zoology this year.

KRAIG K. ADLER (U. Notre Dame) received the Thomas J. Madden Teaching Award for his outstanding classroom teaching.

ROBERT E. GORDON (U. Notre Dame) was appointed to the newly created position of Vice President for Advanced Studies, which combines the previous functions of the vice president for research and sponsored programs and the dean of the Graduate School.

STEVEN J. ARNOLD (U. Michigan), who is finishing his PhD dissertation ("The evolution of courtship behavior in salamanders"), will go to U. California, Berkeley, on a postdoctoral program with David Wake.

JANE A. PETERSON (U. Chicago), who is finishing her PhD dissertation on chameleon anatomy, will go to U. Michigan on a postdoctoral program with Carl Gans.

JEFFREY W. LANG (U. North Dakota) now finishing his MS thesis, will go to the U. Minnesota for his PhD work.

ARNOLD G. KLUGE (U. Michigan) has received a Guggenheim Fellowship for 1971-72, to study the reptiles of New Guinea and Australia.

DAVID S. SNYDER (U. Notre Dame) now finishing his PhD program ("Function of brooding behavior in the Green Salamander, Aneides aeneus"), returns to his position as Associate Professor of Biology, Austin Peay State University, Tennessee.

DOUGLAS H. TAYLOR (U. Notre Dame) will go to Miami U. (Ohio) as Assistant Professor of Zoology.

HERPETOLOGY AT THE UNIVERSITY OF RHODE ISLAND

Herpetological activities at URI have been increasing in recent years. In addition to the herpetology course taught this spring by Dr. Herndon Dowling, Adjunct Professor of Zoology, a number of herpetological research projects are underway. Recent Ph.D. theses include:

1970. ROBERT W. GUIMOND: Aerial and aquatic respiration in four species of paedomorphic salamanders: Amphiuma means means, Cryptobranchus alleganiensis alleganiensis, Necturus maculosus maculosus and Siren lacertina.

1971. JOHN H. SONGDAHL: The role of the parapineal in oxygen consumption cycles in the blue scaly lizard, Sceloporus cyanogenys (Cope).

1971. PAUL M. McILVAINE: Infrared reception in boid snakes.

1971. ORLANDO DeLUQUE: Oxygen dissociation curves of amphibians from different habitats.

Current graduate students and their thesis topics are:

Ph.D. MARK I. CONLEY: Effect of thyroxine, photoperiod and environmental temperatures on daily changes in metabolic rates of the toads Bufo boreas and Bufo marinus.

Ph.D. THOMAS L. DOTY: Competitive interactions of Ambystoma.

Ph.D. TERRY E. GRAHAM: Thermal ecology of the painted turtle, Chrysemys picta picta (Schneider).

M.S. THOMAS A. CAPRARO: Radiation tolerances of amphibians.

M.S. ANNE M. FORBES: Rare earth metabolism in Chelonia mydas.

M.S. JOSEPH J. SCHALL: Ecology of Cnemidophorus on Aruba.

M.S. SILAS C. WADE: Feeding behavior of slider turtles.

M.S. THOMAS G. ZACCONE: Karyology and relationships of some xenodontine snakes.

Dr. C. ROBERT SHOOP is conducting research on the population dynamics of local Ambystoma species, the biology of amphibian larvae, and orientation of amphibians and reptiles. Dr. Dowling continues his research into the systematics of reptiles, and bibliographic resources in herpetology. JAMES BRADLEY of the URI Computer Center has provided substantial aid in herpetological information retrieval.

The present ties between the Department of Zoology and the American Museum of Natural History allow the development of a particularly broad experience for herpetology students. Colloquium speakers this year included Drs. Walter Auffenberg (U. Florida), Kraig Adler (U. Notre Dame), Donald Tinkle (U. Michigan), and Henry Wilbur (Rutgers U.). Class trips in 1971 to the Savannah River Ecology Laboratory and to St. Catherine Island, Georgia, provided field experiences in different habitats. -- CRS.

C O R R I G E N D U M

A line was dropped from the legend to the figure in COLE, C. J. 1971CRF, HERPETOL REV 3(2): 37. It indicated that the line in the figure was equal to 10 micra.

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Membership is open to anyone interested in amphibians and reptiles.

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Herpetologists' League
Department of Biology
Southwestern State College
Weatherford, Okla. 73096

SUBSCRIPTION TO THE CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

A loose-leaf series of species accounts of the amphibians and reptiles of the Americas, with special emphasis on those in the United States and Canada.

The Binder, Index Tabs, and all 100 accounts published to 1970 cost $18.00 to individuals, $20.00 to institutions. Subscription to the 25 accounts to be published in 1971 is an additional $5 for individuals, $7 for institutions.

Write:
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Herpetological Catalogue Comm.
Amer. Mus. Nat. Hist.
New York, N.Y. 10024

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ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be type-written on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $23.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/8 inches (one column) or 9 1/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 12 3/4 inches). Line cuts are reduced about 25 per cent in processing. [See also the special instructions for "Un-reviewed."]

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

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"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

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AND THE PEOPLE WHO STUDY THEM

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HERPETOLOGISTS' LEAGUE

VOLUME 3, NUMBER 3
JUNE 1971

Herpetological Review

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and the

HERPETOLOGISTS' LEAGUE

by

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS

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ARTICLES

47 THE ALBUQUERQUE MEETING, by William G. Degenhardt. Co-sponsored by the Herpetologists' League, this probably will be the largest in the Society's history.

49 GALAPAGOS TORTOISES, 1971, by Peter C.H. Pritchard. Observations on a recent trip give further hope for saving some of the island forms.

UNREVIEWED-UNEDITED COMMUNICATIONS

53 TAXONOMIC RECOGNITION OF TRIPLOID AMBYSTOMA SALAMANDERS, by James D. Lazell, Jr. The author opposes the application of specific names to the hybrid populations.

55 CHROMOSOMES OF THE HYLID FROG, PHYLLOMEDUSA DACNICOLOR COPE, by Charles J. Cole. Phyllomedusine hylids have similar chromosome complements, and appear to differ from other members of the family.

DEPARTMENTS

46 EDITORIAL

BOOK REVIEWS
57 Savage on Duellman's "Hylid Frogs."

T35 CURRENT HERPETOLOGICAL TITLES

NEWS AND ANNOUNCEMENTS

52 Regional Societies Page
58 Meetings and Societies
Individuals and Institutions
59 Caribbean Research Page

SOCIETY NOTES

46 The Herpetologists' League
46 The Society for the Study of Amphibians and Reptiles
60 Advice to Authors; Memberships; Address changes

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S S A R

The Society was founded in 1958 as THE OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communications between amateur and professional workers.

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E D I T O R I A L

The "Amalgamation Committee," described in HERPETOLOGICAL REVIEW 3(1) is steadily working on its report which will be presented at the Albuquerque Meeting, and again at the Philadelphia Meeting of the societies. The aim is to provide an easy transition from the two national herpetological societies (HERPETOLOGISTS' LEAGUE, and SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES) to a strong, truly international society which will be better able to provide its members, and the entire field of herpetology, with the publications and services needed by this active field. We are hopeful that such amalgamation might be possible at the proposed Lake Texoma Meeting of the societies in 1972.

Meanwhile, too, the SSAR is attempting to strengthen its relations with the various regional societies.

Among the many questions being considered by the Committee, the following are, perhaps, among the most important or controversial.

1) Aims and working structure of the Society;
2) Membership categories and dues structure;
3) Publication policies and subscription rates;
4) Officers of the Society and the mode of selection;
5) Carryover of present Officers and Boards during the transition period;
6) Standing Committees and their instructions;
7) Name of the unified Society;
8) Time-table of amalgamation steps.

We hope that as many members as possible will attend these important meetings. Whether you do or not, you should feel free to make your opinions known to the Committee, in person or by mail. Any Committee Member contacted will inform the others of your ideas. Please let us know. -- HGD.

HERPETOLOGISTS' LEAGUE

The Herpetologists' League is an international organization established by Major Chapman Grant in 1936. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1970 it had 940 members and fellows, 24 life members, 10 honorary members, and 400 institutional subscriptions to its journal, HERPETOLOGICA.

All persons interested in herpetology are eligible for membership. Members receive HERPETOLOGICA (and now HERPETOLOGICAL REVIEW), to which they can submit manuscripts for publication. They may also present papers at the Annual Meeting.

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THE ALBUQUERQUE MEETING

By

William G. Degenhardt

The fourteenth annual meeting of the Society for the Study of Amphibians and Reptiles is being combined with a meeting of the Herpetologists' League this year. This combined meeting will be on the campus of the University of New Mexico in Albuquerque, New Mexico.

Located in the center of the "Land of Enchantment," Albuquerque is a city of 300,000 which boasts of its smog-free air and scenic backdrop of the 10,678-foot Sandia Mountains. Albuquerque's climate is mild, and the low relative humidity makes summer warmth pleasant. August is a time of occasional afternoon showers. However these are usually so brief that raincoats are rarely needed.

New Mexico has much to offer the biologist. The floral spectrum ranges from alpine meadows and mixed conifer forest in the mountains to grassland and Chihuahuan desert in the valleys. Herpetological exploration of New Mexico began relatively recently and has revealed many interesting forms, including such things as endemic salamanders, parthenogenetic lizards, and arid-adapted anurans.

Dozens of Indian communities quietly conserve pre-Columbian traditions. The Spanish people of New Mexico ruled the area for three centuries, and in the capital city of Santa Fe there are buildings still in use that were built before the Pilgrims landed. To the delight of connoisseurs, both Indian and Spanish cultures have richly flavored the art, architecture, and food of New Mexico.

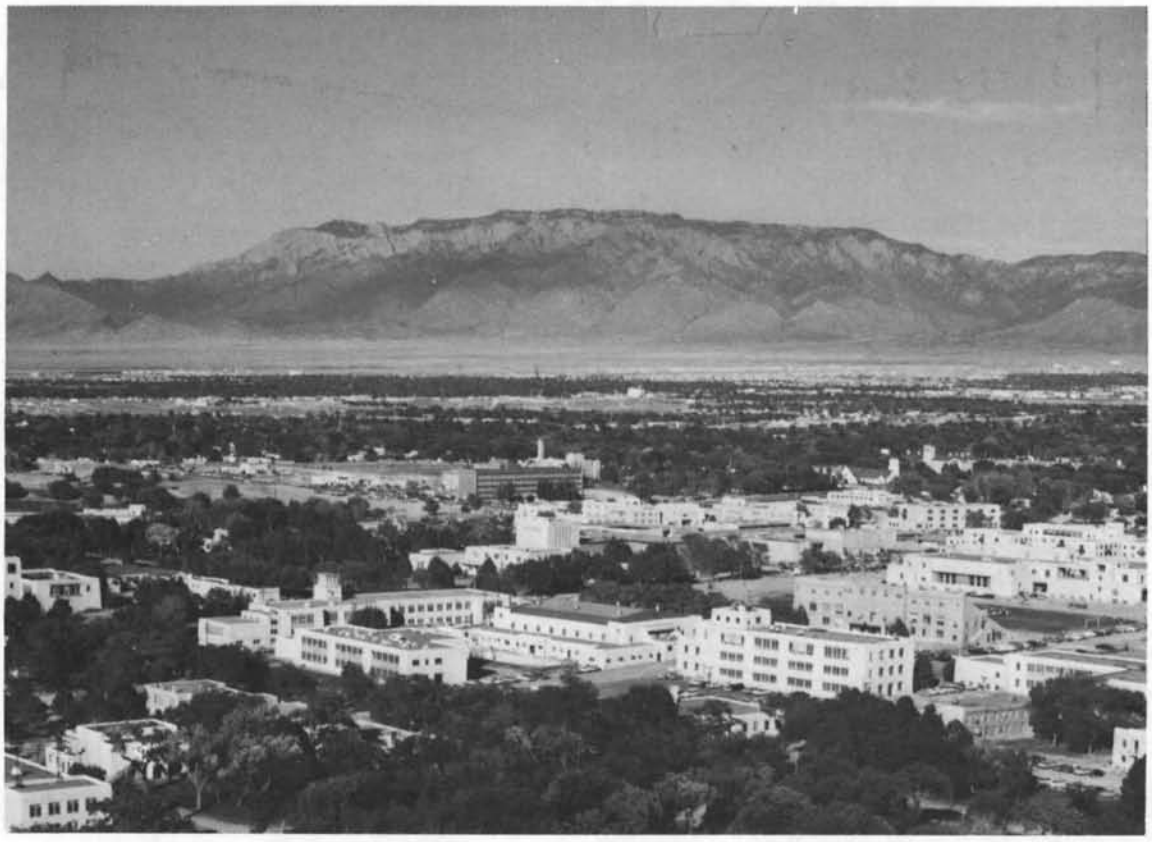


FIGURE 1. Over the UNM campus looking northeast towards the Sandia Mountains. Central New Mexico offers choice recreational and herpetological study areas.

In addition to four sessions of contributed papers, the meeting will include two sessions of longer, invited papers. Centered around this year's theme, the ecology of arid-adapted amphibians and reptiles, the sessions of invited papers will be chaired by Charles M. Bogert and will include: "Temperature regulation in desert amphibians and reptiles: past, present, and future studies" (Bayard H. Brattstrom, California State College at Fullerton), "A bioenergetic approach to food niche dimensionality in three sympatric species of spadefoot toads" (Arthur E. Dunham, University of New Mexico), "Evolution and biogeography of the southwestern herpetofauna" (Charles H. Lowe, University of Arizona), "Water and electrolyte balance of desert reptiles" (John E. Minnich, University of Wisconsin, Milwaukee), "Transient energy budget studies: their implications for analysis of behavior, physiology, and predator-prey interactions of desert reptiles and other animals" (Warren P. Porter, University of Wisconsin, Madison), and "Energy flow in southern Nevada populations of Uta stansburiana: a three-year analysis" (Frederick B. Turner, Philip A. Medica, and Bruce W. Kowalewsky, University of California at Los Angeles).

Lodging and meals will be available on campus; cost is anticipated at about $4 per person per night for rooms and $3.75 per day for meals. Social and sight-seeing activities are being planned for herpetologists and their families. Anyone interested in exhibiting photographs or other materials should contact the local committee as soon as possible. Also, some thought is being given to a book-journal-reprint "sell and swap."

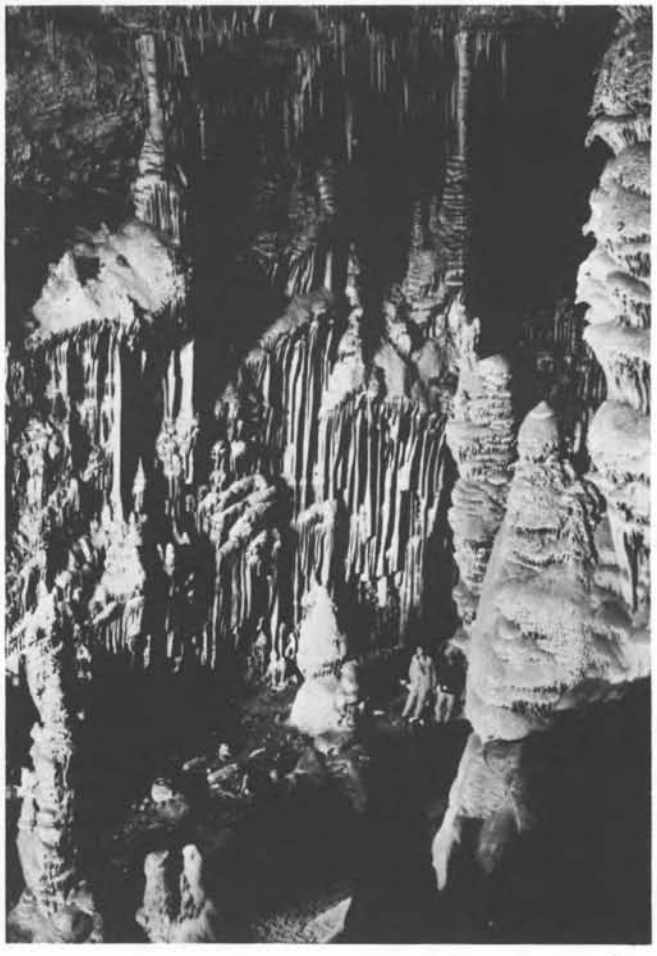


FIGURE 3. Carlsbad Caverns and hundreds of other caves attract tourists and spelunkers to the Guadalupe Mountains in southeastern New Mexico. This is the Entrance Room of Cottonwood Cave, one of the more spectacular.



FIGURE 2. Research facilities and exhibits will be on display in the UNM Biology Building (Castetter Hall). Of special interest are the greenhouses and herpetological collections.

All inquiries should be addressed to the chairman of the local committee:

Dr. William G. Degenhardt
Department of Biology
University of New Mexico
Albuquerque, NM 87106

GALAPAGOS TORTOISES, 1971

By Peter C. H. Pritchard

In the February 1971 issue of Herpetological Review, I outlined the survival prospects of several races of Galapagos tortoise. In January and February of this year, I was able to re-visit the islands, and to locate specimens of four more races of tortoise - the two northern and the two southern races on Albemarle Island, or Isabela, the largest island in the group and the only one with more than one race of tortoise.



Figure 1. G.e. elephantopus(adult male at the base of the east flank of Sierra Azul, Albemarle Island.

The tortoises of Volcan Wolf, which is the highest mountain in Galapagos and is situated at the northern end of Albemarle, are usually called Geochelone elephantopus becki. However, Rothchild's type specimen of Testudo becki, collected by Rollo Beck in about 1900, was taken on Cape Berkeley, a massive and precipitous mountain at the north-west tip of Albemarle, which is separated from Volcan Wolf by several miles of jagged lava, completely impassable to a tortoise. If the collection data are accurate, there are six, not five, isolated populations of tortoises on Albemarle, and, if it proves distinct, the Volcan Wolf population will have to have a new name. However, Cape Berkeley is rarely visited and almost never climbed, and we do not know if tortoises exist there today. The lower slopes of the mountain are exceedingly steep, but from a boat one can see high plateaus which could conceivably harbor tortoise populations.

Tortoise still exist on Volcan Wolf, and, since they come quite close to the sea both on the north coast and at Bank's Bay on the south-west side of the volcano, they may be found within only an hour or two's walk from the coast. Herndon Dowling found several of various sizes on the north coast a few years ago. I landed at Bank's Bay on January 21, 1971, and after crossing a mile or so of really hideous terrain found seven tortoises, all small to medium in size. This population appears to be reproducing quite successfully, as pigs and rats, both voracious predators on hatchling tortoises, are not present on this part of the island. The only introduced mammals on both the northern two volcanos of Albemarle are cats, and they are not plentiful. The Wolf tortoises are, morphologically, a strange mixture. The 'saddleback' shape shown by several races of Galapagos tortoise is only developed as maturity is approached, and tends to be most extreme in the largest individuals. However, the Wolf population shows both dome-shaped tortoises and good saddlebacks, the former perhaps outnumbering the latter, but neither shape seeming to show any relation to age, or even to sex. It is conceivable that a formerly isolated pure saddleback population on Volcan Wolf has been invaded within comparatively recent times by an influx of dome-shelled tortoises from Volcan Darwin to the south; this hypothesis assumes either that the two populations have not interbred, or that they have undergone secondary intergradation with a production of extreme as well as intermediate intergrades.

Tortoises are not as easy to find on Volcan Darwin as they are on Volcan Wolf. I ascended the volcano from Tagus Cove on January 22. Within an hour of leaving the sea I was in country obviously frequented by



FIGURE 2. Warden Arnaldo Tuzpina taking approximate measurements of a young G.e.guntheri near Cerro Grande on Albemarle Island.

tortoises, judging by the presence of numerous old pieces of dung, and the crumbling skeletons of two tortoises killed, probably by fishermen, some years before. However, I had reached about half way to the rim of the crater before finding a live tortoise, and that was only a small one, about fifteen inches long. A few hundred yards from the crater rim I came across five more tortoises, the largest being an adult female. Despite the low density of tortoises on the mountain, it is noteworthy that, of the six individuals found, in two cases tortoises were resting within about two feet of each other. Similarly, on Volcan Wolf, the first three tortoises found were chasing each other down a trail and were only a few feet apart.

I did not re-visit the thriving and abundant population of tortoises in the crater of Volcan Alcedo. However, I understand that the geyser on the southern part of the crater wall has dried up, depriving the tortoises of one of their few sources of standing water. Also, a fire burned over about ten per cent of the rim in 1970, but it appears that the tortoises in this area managed to escape, and new vegetation is already showing through.



FIGURE 3. James Island toroise, Geochelone elephantopus darwini hatching at the Charles Darwin Research Station.

The two tortoise populations on the southern half of Albemarle Island (Geochelone elephantopus guentheri and G. e. elephantopus) are much reduced from former times, this being a fertile, settled area and the site of a former penal colony. However, both subspecies still exist, and both are reproducing.

G. e. guentheri is now confined to an area between the eastern part of the rim of the crater of Sierra Negra and Cerro Ballena. About 150 have been marked by the resident wardens, almost all of which were immature; the average tortoise here is only about eighteen inches long. Nevertheless, no one has been able to locate a nesting zone. The tortoises are very thinly spread out, and in an entire days search in the tortoise area we only found two. This population is only a couple of hours' walk from the settlement of Santo Tomas, and tortoises are still occasionally killed by settlers. Feral mammals of various kinds are found in this area, but have not undergone any population explosion. In the course of our day's walk we found three goats, all of which we shot.

The southeastern volcano of Albemarle, Sierra Azul, can be reached on foot from Santo Tomas. The trail passes along the rim of the Sierra Negra crater, the second-largest crater in the world (Ngorongoro is larger). Unlike Ngorongoro, and unlike Volcan Alcedo, Sierra Negra is a sterile crater, harboring little except lichens; there is no shade, water, or food for tortoises, nor could tortoises ascend the very steep slope to the rim. The trail then passes through an area of lush grass, from which tortoises were exterminated by settlers. Tortoises are found on the east, south, and west slopes of Sierra Azul. A long tongue of lava, only about 45 years old, extends from the eastern side of the mountain almost to the south coast of the island, effectively dividing the range of G. e. elephantopus. Only a few tortoises now live on the eastern side of the lava, where feral pigs impede successful reproduction, but there is a good, and reasonably undisturbed, nesting zone within a few yards of the western side of the fresh lava. In the course of a day we found eight tortoises in this area, ranging in length from about ten inches to about 40 inches. We also found several old nests, some from which young had escaped, others with eggs containing mummified young, and one with a hatchling tortoise in the process of emerging. We also found a dead, intact hatchling about one foot from a nest; it had presumably been killed by exposure to the sun. For some reason eggs and hatchlings of this race are smaller than those of any other subspecies, even though the adults reach a large size. Feral mammals of various kinds roam Sierra Azul, and wild dogs in particular are a menace to tortoises not only of hatchling size but for several years afterwards. About 150 tortoises of this population have now been marked.

Tortoises are still found near the coast at at least two sites on southern Albemarle:



FIGURE 4. Hatchling G.e.porteri, hatched at the Darwin Station

near Cape Rose, and near Iguana Cove. Time did not permit me to visit either of these populations.

In January 1971 I was able to re-visit James Island, where a new trail has been cut to the 'pampas' in the highlands. This is a huge area of rolling lush grassland, with isolated hills, whose existence is hard to believe when one sees the desert-like lowlands of James. Jose Villa from the Darwin Station spent four months in this area in 1970, and raised the total of marked tortoises on the island to about 350; the present estimate for the entire population is around 500. Almost all are very large, old individuals, and males outnumber females. Villa shot about 1500 feral pigs during his stay on the island, but estimates that about 3000 remain. There are also an estimated 25,000 goats! However, for the time being there is food enough for the tortoises; it is more important to use one's valuable ammunition on pigs, which eat the hatchling tortoises. Two or three good nesting areas were located by Villa, and the eggs were transported to the Darwin Station, where by late February over sixty had already hatched.



FIGURE 5. One of the first Hood Island hatchling G.e.hoodensis breaking free from the egg at the Darwin Station

There is also exciting news about the prospects of the Hood Island tortoise. A captive group of a male and three females has been maintained at the Darwin Station for about three years, leaving a known male and two females on Hood Island. An expedition early this year to try and locate the male failed, but one of the two females on the island was found, and was brought back to the station. A total of 44 eggs was produced by the captive group last year, and when I left in late February six of these had hatched. In a recent letter from Peter Kramer, the new Director of the Station, I learn that they now have 16 healthy hatchlings of the Hood race. Dr. Kramer also mentioned that they have succeeded in breeding the Chatham Island race in captivity, up to now ten hatchlings (including two albinos) having been produced. The population on Chatham Island is not reproducing well in the wild, though 150 tortoises have now been marked and as many as 300 may exist. In future years it is hoped to bring Chatham tortoise eggs to the Station for artificial incubation and raising.

Twenty-five year-old Duncan tortoises (G. e. ephippium) were recently taken back to their native island, and appear to be adjusting well to their first taste of freedom; they are growing faster than a control group of nine of the same age still at the Darwin Station. Craig MacFarland and three wardens hiked up to the highlands of Duncan, each with five tortoises on his back; not only an arduous job, but a messy one, as those who have handled well-fed tortoises can verify! The total number of marked adult tortoises on Duncan still stands at about 105. Of the other population, 1338 have been marked on Indefatigable, and about 400 on Volcan Alcedo, Albemarle. However, no special effort is being made to mark the relatively safe populations on the three northern volcanos of Albemarle.

As readers of the Review may perceive, Herndon Dowling and I represent poles of pessimism and optimism as far as the future of the giant tortoises is concerned. It is true that the Darwin Station had to wait several months for a new Director; but most will agree that Dr. Peter Kramer, the new Director, was worth waiting for. Dr. Kramer is stepping up the frequency of goat-killing trips to Barrington Island; a party of wardens now visits the island every three weeks or so, to kill every goat they see. The population has now been reduced to a hard core of fifty or so, resident in a dangerously precipitous zone at one end of the island. If the goats can be completely eliminated, or even just kept down to their present numbers, the vegetation of the island will have a chance to recover. Dr. Kramer is also organizing trips to Bindloe Island, to eliminate the goats which appear to have been introduced to this island very recently. Goats are now so numerous on Abingdon Island that it will take a major - and very expensive expedition to eliminate them, or even thin them out.

It is also, regrettably, true that Beagle III has not yet arrived in Galapagos, and visiting scientists are still dependent on local fishing boats. However, it should be pointed out that Beagle II did not sink by accident, but was stripped of its fittings and sunk deliberately when it was deemed no longer seaworthy.



REGIONAL SOCIETIES PAGE

In previous issues of HERPETOLOGICAL REVIEW I promised to update the list of regional herpetological societies (H R 2(3)). Three such societies and one new publication have recently come to our attention. They are the Florissant Herpetological Society, The Florissant Turtle and Tortoise Society, The West End Reptile Club, and Volume 1, No. 1 of the Bulletin of the Philadelphia Turtle and Tortoise Club. Each is described briefly below.

FLORISSANT HERPETOLOGICAL SOCIETY (Gary R. Bloyd, 42 Radford Dr., Florissant, MO 63031). This is a small club of local amateur herpetologists -- something like a neighborhood club. It publishes a monthly bulletin on different general aspects of herpetology. Activities include snake hunts and field trips. It is strictly a local organization. (Bulletin nos. 1-26 were published in 1970; nos. 27-29 in 1971).

FLORISSANT TURTLE AND TORTOISE SOCIETY (Jim Selke, 1340 Layven Ave., Florissant, MO 63031). Another local group which publishes an irregular bulletin on different aspects of turtles and turtle-keeping.

SONS OF DAMBALLA (sound familiar?) was once part of the name of the Western Reptile Association. Arden Brame was kind enough to send us the early issues of their Bulletin. From these we learned that Damballa is the main deity in the Voodoo religion. Damballa in Africa was Chango, god of fire. Damballa became the main god whose spirit was housed in a snake. These people saw the ancient wisdom a snake seemingly possesses. Because it is considered the servant of Damballa, the snake is treated with reverence, and is protected and honored.

Bulletin #1 appeared in 1967, nos. 2-7 appeared in 1968. The same year the society changed its name to WEST END REPTILE CLUB. Bulletins 8-13 appeared under that name for the rest of the year. Nos. 14-19 were published in 1969 and 20-(?) in 1970.

Volume 1, no. 1. There is a new publication on the market, by the recently-established Philadelphia Turtle and Tortoise Club. It is a clear plastic - covered Bulletin in a ring binder. And all for $2.00 per year.

IUCN CROCODILE COMMITTEE MEETING
New York Zoological Park
15-17 March 1971

The participants included: Angus Bellairs, Robert Bustard, Robert Chabreck, Hugh Cott, Max Downes, Fred Hauptfuehrer, Rene Honegger, Wayne King, Fred Medem, James Oliver, Tony Pooley, James Powell, Moira Warland, Uthai Yangprapakorn.

Agenda Topics:

1. Talks on National and Regional situations. Reports on the crocodilians found in various countries.
2. Controlled breeding of crocodiles as a means of reducing pressure on wild populations.
3. Other items included: A Conservation program for crocodiles. National Parks and the Red Data Book. The Crocodile Foundation.
4. Crocodile Biology and Ecology.

The evidence presented at the meeting shows that all species of crocodiles are declining in numbers all around the world, with the exception of the American alligator. The reason the alligator is not declining is because of the recent protective legislation passed by the Federal, State and local governments. Special attention was called to the critically endangered status of the Apaporis River caiman of Colombia, which has become the subject of wide-spread hunting in the last two years, and the Cuban crocodile which may be lost through genetic swamping with the American crocodile, with which it shares the holding corrals in the Zapata Peninsula National Park in Cuba. At least two species, the Cuban crocodile and the Siamese crocodile are presently more abundant in captivity than in the wild. It is estimated that fewer than 200 wild crocodiles of any species remains in Thailand while over 11,000 are in captivity in the one crocodile farm there.

HERPETOLOGY COURSE AT NYU

A two-semester, graduate-level course in systematic herpetology, utilizing the resources of the American Museum of Natural History, will be taught by Herndon G. Dowling, Adjunct Professor of Biology, NYU, beginning Fall 1971.

Tentatively, the course will consist of two hours of lecture and two of laboratory work (evenings) each week, plus several field trips (4 credits per semester). The Fall Semester will be devoted to the study of reptiles, the Spring Semester to amphibians.

For further information, write:

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CURRENT HERPETOLOGICAL TITLES, 1970 - 1971

Herpetological Information Search Systems
American Museum of Natural History
New York, N. Y. 10024

We have brought to your attention more than 13,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1970-1971) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be even more current. We hope that the added numbers will serve to reduce the titles-per-issue to a more manageable number.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 2 March through 31 March 1971. Periodical title abbreviations follow the American Standard for Periodical Title Abbreviations Z 39.5-1963 (American National Standards Institute, Inc., New York).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and L. Greene. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. Dr. Robert W. Winter provided us with translations of titles, abstracts and papers from Slavic languages. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 31 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

HERPETOLOGICAL
INFORMATION
SEARCH
SYSTEMS



OFFERS:

COPIES of original descriptions or other important literature.

DRAWINGS of important taxonomic features.

CONSULTATION on projects involving amphibians and reptiles, their literature, morphology, ecology....

SPECIAL BIBLIOGRAPHIES on amphibians and reptiles, restricted by subject and/or taxon and/or geography.

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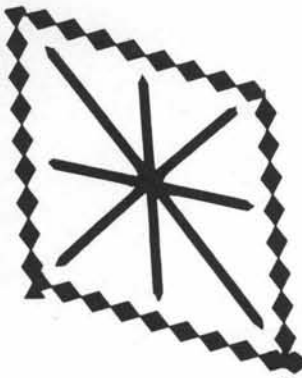
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A NOTE TO CATALOGUE SUBSCRIBERS

Subscribers to the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES have received the first three issues of this year's HERPETOLOGICAL REVIEW without charge. We hope that you have enjoyed this contact.

However, unless you are a member of one of the herpetological societies (H L or SSAR), you will not receive future issues of this publication. If you are not presently a member, we suggest that you join either (or both) of these organizations. Dues are $8 for either Society; separate subscription to H R, if you do not want to join, is $5.

Information on the societies is found on page 46. Instructions for joining are on page 60.



A QUESTIONNAIRE FOR HERPETOLOGISTS

To aid the Editor of HERPETOLOGICAL REVIEW in visualizing his audience, and to help the Amalgamation Committee in determining needed services and in predicting membership, we ask that everyone with an interest in amphibians and reptiles fill out the following questionnaire. The information will be used only in statistical fashion and for identifying your field of interest. If any of your associates are interested in this field but do not receive H R, please xerox him a copy or have him send to us for another.

1. Name:_____ 2. Address:_____

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3. I would class myself as a:
   - __ Student (please indicate level)_____
   - __ Zoologist - herpetologist
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4. My specific interest in herpetology is:_____

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(Please be precise: "Ecology of Cnemidophorus," "Taxonomy of ranid frogs,"etc.)

5. I belong to (subscribe to) the following national societies (PUBLICATIONS):
   - __ Society for the Study of Amphibians and Reptiles (J HERPETOL)
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6. I belong to the following regional societies:
   - __ Philadelphia Herpetological Society
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   - __ OTHER (please list):_____

7. Of the various features in HERPETOLOGICAL REVIEW, please rank them in terms of your interests: (use numerals 1 - 6)
   - __ Major Articles
   - __ Current Herpetological Titles
   - __ Unreviewed - Unedited Publications
   - __ Regional Societies Page
   - __ Other (please list)_____

8. What new features would you like to see included ?

Moves toward amalgamating the SSAR and the H L are still in an early stages, and it is possible that amalgamation will not come about. However, the following questions assume that the two societies will join.

9. What name would you prefer for the society ? [Indicate 1st, 2nd, & 3rd choices.]
   - __ Society for the Study of Amphibians & Reptiles
   - __ Herpetologists' League
   - __ Society for the Study of Herpetology
   - __ Herpetological Society of America
   - __ OTHER (please list)
   - __ International Herpetological Society
   - __ The Society of Herpetologists
   - __ The Society of Herpetology
   - __ The Herpetological Society

_____

10. At present, members of the H L are paying $8 or $10, those of SSAR pay $8 or $15. A combined society would need a graduated dues structure to accomodate to the varying needs of its large membership. Three Classes of members have been suggested, each to receive substantially different publications and services. The member Classes may be something like the following. Please indicate which class you would probably choose.
   - __ Associate Member (Non-voting; receive HERPETOLOGICAL REVIEW only)..... $6.
   - __ Regular Member (Voting; receive H R, plus the journals of both societies)..... 15.
   - __ Professional Member (as Regular, plus other substantial benefits)..... 40.

11. Any additional comments ?

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UNREVIEWED-UNEDITED

TAXONOMIC RECOGNITION OF TRIPLOID *AMBYSTOMA* SALAMANDERS

James D. Lazell, Jr.

Uzzell's (1964) monumental work on the salamanders of the *Ambystoma jeffersonianum* complex resulted in recognition of four different sorts of salamanders: *A. jeffersonianum* (Green) and *A. laterale* Hallowell are distinct, bisexual species; triploid females associated with *jeffersonianum* were called "*A. platineum* Cope," and triploids associated with *laterale* were called "*A. tremblayi* Comeau." No theoretical discussion was presented to justify giving the unisexual, gynogenetically reproducing triploids rank as species. Maslin (1968) has provided a summary discussion of the taxonomy of uniparental organisms, but uses the phrase "sexual isolation" in a way that confounds gynogenesis and parthenogenesis - two very distinct modes of reproduction. Maslin is clearly implicit in his view that all uniparental forms result from interspecies hybridization; this is certainly the case with the triploid salamanders (Uzzell and Goldblatt, 1967). My own field work (Lazell, 1968, 1970) has brought the issues into sharp focus. The answers to five major questions are relevant here:

(1) *Do new species originate from interspecies hybridization?* The eminent botanist Stebbins (1950, p. 279) states "hybridization...is...by its very nature not a way of producing new morphological or physiological characteristics, and therefore of progressive evolution." Stebbins proceeds to cite various examples of hybrids that have been given names, in almost all cases eventually resulting in a ranking of parental forms as what we (and Stebbins) would regard as subspecies. In the genus *Viola*, and several others, however, Stebbins notes apparently full species resulting from interspecies hybridization. He notes (p. 287) "the evolutionary importance of such fertile hybrid derivatives depends on both their morphological characters and on the degree of fertility or sterility which is found when they are crossed back to their original parents."

Essentially, some forms of hybrid origin do qualify as full species, if they are capable of intrabreeding (as individuals, with each other), and incapable of interbreeding with their parental (or other) species. Species of hybrid origin, among plants at least, are rare; most hybridization does not result in the evolution of new species.

Except for parthenogens, no unequivocal or uncontested case of a species of hybrid origin exists in animals. Lorenz (e.g., 1952) has suggested in popular literature that the dog, *Canis familiaris*, is a form derived from hybridization between the wolf, *C. lupus*, and the jackal, *C. aureus*. No one known to me takes this very seriously, and the usefulness of regarding *C. familiaris* and *C. lupus* as distinct species in the first place is highly questionable. Examples of "species" of birds of hybrid origin are rampant. In all cases, the hybrids so described have proved to be either rare freaks, intergrades between forms properly regarded as subspecies, or hybrid swarms occurring in temporary habitats and not qualifying for species rank in terms of internal intrabreeding to the exclusion of parental interbreeding. Even in the most controversial cases, the hybrid forms lack any adaptively significant, inheritable innovations of their own; they are strictly combinations of parental characters. As examples, see Meise (1936) and Vaurie (1959, pp. 567-573), and works cited therein.

Johnston (1969) has reconsidered the complex of geographic variation, colonization, sympatry, divergence, and hybridization that typifies the *Passer domesticus* - *P. hispaniolensis* situation around the Mediterranean. Despite current interbreeding and obvious past hybridization, he concludes that full species status may be the simplest nomenclatorial solution for the *Passer* populations of the Italian peninsula. This is equivocal at best, but at least evidence indicates that selection has modified the hybrid populations away from the phenotypes available from a simple F-1 hybrid sample. This may be an example of a species of hybrid origin in animals, but it is not comparable in most features to the triploid salamander case.

It is important to note that the International Code of Zoological Nomenclature, in Article I, takes these facts into consideration and expressly forbids the giving of scientific names to "hybrids as such". It is equally important to note that the populational status of the hybrids is not an operative criterion in the wording of the Code. "Hybrids as such" frequently form populations, or "swarms". Examples for birds are cited above; Cory and Manion (1955), and works cited therein, document the well-known case in amphibians: *Bufo americanus* x *B. fowleri*.

Although valid plant species may rarely evolve from interspecies hybrids, no genuinely analogous phenomenon has ever been reported in the animal kingdom. Certainly, gynogenetic salamanders - being incapable of intrabreeding and requiring mating with a parental species for propagation - are not comparable to the few known examples in plants.

(2) *Are gynogenetic forms reproductively isolated?* As Uzzell (1964, p. 291) points out, the triploid *Ambystoma* females are genetically isolated from their parent species; that is, no recombination of genetic material takes place prior to embryogenesis. All gynogenetic specimens, however, require the presence (at least) of males of one or the other of the parental species; they are unable to reproduce by themselves. Thus, from a behavioral (and probably mechanical) viewpoint, these salamanders are reproductively bound to normal, diploid mates. Further, their genetic isolation is individual, not populational. That is, every triploid individual is genetically isolated from every other; each specimen would thus qualify as a reproductively isolated entity, in the simplistic, genetic sense.

(3) *Is gynogenesis analogous to parasitism?* If behavioral and mechanical factors bind triploids to diploids, and thus prevent the former from evolving independently, cannot the same be said of a strictly host-specific parasite? Waitz (1959, 1960), and works cited therein, provides examples of strongly host-specific parasites in amphibians. An analogy to gynogenetic salamanders is strained at best. Host-specific parasites are not close relatives of their hosts; certainly, they do not share their host's genome. They live within their host individuals just as non-parasitic organisms live within habitats of clearly defined limits. For a parasite, the host is the environment; for a triploid female salamander, the diploid male is simply the functional mate. True, the parasite needs its host species in order to survive, and the triploid salamander needs the diploids. However, a fish needs the water, and we all need the air. Environmental features and habitats are necessary for the survival and evolution of all species. Members of the opposite sex, required as mates, are not meaningful analogs of environmental features and habitats; parasites' hosts are.

(4) *Are gynogenetic and parthenogenetic forms different from a taxonomic viewpoint?* If parthenogenetic forms can evolve by means other than hybridization, then one barrier to the recognition of some of them as species is immediately overcome. It is true that parthenogens do not qualify for species status by intrabreeding; at least, however, they are sharply distinct from gynogens in not requiring behavioral (or mechanical) interbreeding with other species. If one adopts the excellent evolutionary species concept of Simpson (1961), then many parthenogens are at least closely analogous to biological or genetical species, and may usefully be regarded as such. Some parthenogens, like the lizard *Gymnophthalamus underwoodi* (see Thomas, 1965) are either not apparently of hybrid origin, or, like various *Cnemidophorus* (see Zweifel, 1965, Wright and Lowe, 1968, and works cited therein) have evolved in a unitary manner (just like other normal species) so far away from any mere interspecies hybrid that determining putative "parent species" is impossible with present evidence.

The situation with the gynogenetic salamanders is in sharp contrast: the form called "*platineum*" has a full, diploid genome from *A. jeffersonianum* and a single set of chromosomes from *A. laterale*. The form "*tremblayi*" is the converse: a full diploid genome from *A. laterale* plus a single set from *A. jeffersonianum*. The

triploid salamanders are phenotypically intermediate between their diploid parent species in direct proportion to the respective quantities of genetic material present. Thus, these gynogens are strictly "hybrids as such" and show no adaptively significant heritable characteristics of their own. They possess no independent ecological niche, a criterion of admitted importance even to Maslin (op. cit., p. 219). Thus, in the cases at hand, at least, a strong argument can be made for very separate taxonomic treatment of gynogens and parthenogens.

(5) Are gynogenetic individuals teratological specimens? The International Code of Zoological Nomenclature, in Article I, expressly forbids the giving of scientific names to "teratological specimens". In normal parlance, a "teratological specimen" is simply a freak, monster, or other abnormal production. All normal vertebrate animals are diploid; all valid species of the genus Ambystoma are bisexual diploids, including the two parental species of the triploids in question: A. laterale and A. jeffersonianum. None has a genome (or phenotype) that is merely a combination of some two other species. Therefore, triploid genomes, formed by simple combinations of the genomes of distinct species in the genus Ambystoma are abnormal formations. Organisms resulting from such a genome are teratological in simple English. Because a comparatively large number of parthenogenetic, naturally occurring forms exist, a strong case can be made that at least some of these are the result of normal formations, and thus not teratological. I do not know of any gynogenetically reproducing form not resulting from some "abnormal formation", and the phenomenon remains freakishly rare in nature.

In summary:

I. Valid species of hybrid origin, in plants, are characterized by: a. intrabreeding as the normal reproductive method. b. a lack of interbreeding with parental or other species. c. significant, adaptive, heritable differences from the parental species, not replicable by a simple combination of parental characteristics.

II. Valid parthenogenetic species are characterized by: a. reproductive independence from all other species. b. significant, adaptive, heritable characteristics not directly the result of hybridization between parental species. c. ecological evidence of independent, unitary evolutionary role, such as a distinctive niche.

III. The gynogenetic salamanders presently known are, from a genetic viewpoint, simple hybrids in the sense of the Code, and are also teratological specimens in the sense of the Code. They fail to qualify as species where some other forms of hybrid origin, or parthenogenetic forms, do qualify because: a. intrabreeding is impossible. b. interbreeding with parental, or other, species is their only method of reproduction. c. they possess no significant adaptive, heritable characteristics of their own, but merely combine characteristics of their parent species. d. they possess no distinctive evolutionary role or ecological niche.

An argument could be advanced that gynogenetic salamanders may be an incipient stage in a process leading to parthenogenesis and the establishment of evolutionary and ecological independence. This is certainly possible, and should it actually occur, a reappraisal of their status would be in order.

On the basis of present evidence, however, whatever we choose to regard them as -- teratological specimens of the species with which they are associated, or hybrids between jeffersonianum and laterale -- the triploids should not be regarded as separate species, either logically or legally. Thus, the name platineum Cope should be returned to the synonomy of A. jeffersonianum (Green), and tremblayi Comeau to the synonomy of A. laterale Hallowell.

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UNREVIEWED-UNEDITED COMMUNICATIONS

Chromosomes of the hylid frog, Phyllomedusa dacnicolor Cope

Charles J. Cole

Among the 450 or so species of hylid frogs in the world is a group of approximately 40 Neotropical species in the subfamily Phyllomedusinae. Most authors agree that these frogs comprise a distinctive phylogenetic unit at the subfamilial level, but there is still considerable discussion as to their classification at the generic level. Duellman (1968, 1970) recognizes three genera: Agalychnis, Pachymedusa, and Phyllomedusa. He considers Pachymedusa monotypic, including only P. dacnicolor, and further suggests that this is a generalized species similar to the ancestral stock from which all the Recent forms evolved. Pyburn (1970) contested one of the important characteristics used by Duellman (1968) to define Pachymedusa, and agreed neither with Duellman's generic classification nor with his suggestion that P. dacnicolor is so primitive.

Inasmuch as earlier investigations indicated that phyllomedusines are distinctive among New World hylids in chromosome number (Duellman and Cole, 1965; Duellman, 1967) and at least one species is a tetraploid (Becak, Denaro, and Becak, 1970), the karyotype of Phyllomedusa dacnicolor is described in detail here with the hope that improved knowledge of the chromosome cytology of the phyllomedusines will result in improved systematics.

Chromosomes of 50 bone marrow cells at mitotic metaphase were examined on slides prepared by means of the colchicine, hypotonic citrate technique used by Cole, Lowe, and Wright (1968). Samples were examined from the following five specimens (four males, one female): No. 18350 in the herpetological collection at the University of Arizona, from Acapulco, Guerrero, Mexico; Nos. 84288-84290 in the amphibian collection at the American Museum of Natural History (AMNH), from the northern outskirts of Alamos, Sonora, Mexico; and AMNH No. 84291, from Quintera Mine, Sierra de Promontorios, ca. 9.0 mi. (by rd.) W. Alamos, Sonora, Mexico. I am grateful to Robert L. Bezy and Philip V. Colbert for assistance in the field, and to Richard G. Zweifel for criticizing the manuscript.

Phyllomedusa dacnicolor has a diploid number (2n) of 26 chromosomes; 14 (7 pairs) are larger macrochromosomes and 12 (6 pairs) are smaller (Fig. 1). Chromosomes 11 and 13 are the closest to being perfectly metacentric, chromosomes 3, 9, and 12 are subtelocentric, and the rest are submetacentric, with some variation in relative arm lengths (compare nos. 1 and 2). Chromosome number 6 has a wide heterochromatic band on the short arm near the centromere. No pair of heteromorphic chromosomes was found.

Phyllomedusines are the only New World hylids known to possess a haploid or basic number of 13 chromosomes (2n = 26), and all phyllomedusines for which such information is available have this number. Chromosome numbers are known for the following Mexican and Central American species: P. annae (n = 13), P. calcarifer (n = 13), P. callidryas (n = 13, 2n = 26), P. dacnicolor (n = 13, 2n = 26), P. helenae (n = 13, 2n = 26), and P. lemur (n = 13) (Duellman and Cole, 1965; Leon, 1970). The only other phyllomedusine for which the chromosome number is known is the South American Phyllomedusa burmeisteri, which is the only one whose karyotype has been published previously (Becak, Denaro, and Becak, 1970). This is a tetraploid species having 52 chromosomes, and thus polyploidy has occurred independently in at least two subfamilies of the hylidae (see also Wasserman, 1970). In the karyotype of P. burmeisteri it is clear that the basic chromosome number is x = 13, and the relative size and morphology of each of the pairs is very similar to those in P. dacnicolor. The most conspicuous differences are that in P. burmeisteri chromosome 8 is subtelocentric (submetacentric in dacnicolor), chromosome 11 is subtelocentric (metacentric in dacnicolor), and chromosome 7 appears to be relatively smaller. Unfortunately, the position of conspicuous heterochromatin in P. burmeisteri, if any, was not described.

The only other hylids known to have a haploid number of 13 chromosomes are several Australian and New Guinean species of the genera Litoria (Australo-Papuan Hyla of earlier authors; Tyler, 1971) and Nyctimystes (Duellman, 1967; Stephenson and Stephenson, 1970). Of these, karyotypes have been published for only two: Litoria caerulea and Litoria phyllochroa (Stephenson and Stephenson, 1970). The karyotypes of these two species are much alike and differ from the karyotype of Phyllomedusa dacnicolor. The most conspicuous differences occur in the positions of the centromeres on chromosomes 5, 8, 9, and 12, in the position of the conspicuous heterochromatin (near the tip of the long arm of chromosome 11 in the Australian forms), and in the size-group classification of the chromosomes. Thus the differences between the karyotypes of the Australian species of hylids with 2n = 26 chromosomes and the Mexican Phyllomedusa dacnicolor with 2n = 26 are greater than those between P. dacnicolor and the South American Phyllomedusa burmeisteri (excepting its polyploid condition!), although the differences between all of them are not very extensive.

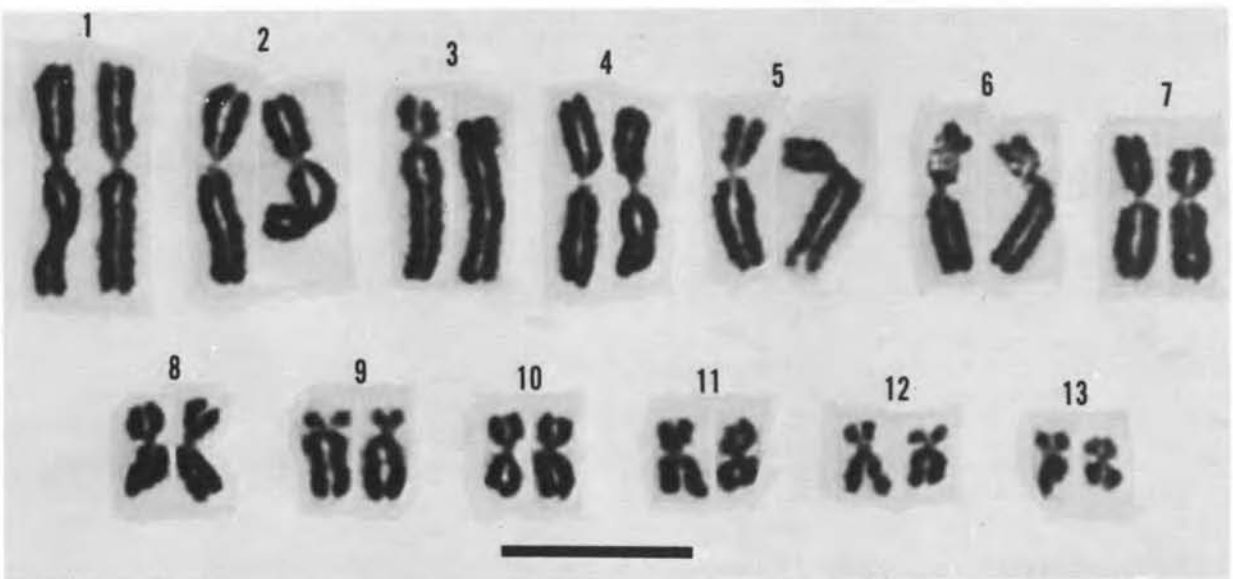


FIG. 1. Representation of the karyotype (2n = 26) of a male specimen of Phyllomedusa dacnicolor (AMNH 84289). The line represents 10 micra.

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[Received 15 April 1971.]

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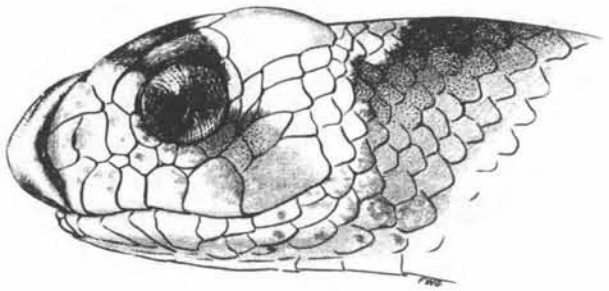
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DONALD MERKLE (Biology Dept., Univ. of Dayton, Dayton, OH 45409) would like to secure individuals of all species of Clemmys, especially Clemmys (Sacalia) bealei. Specimens will be used in a systematical analysis utilizing comparative serum protein electrophoresis. Specimens will be returned, if desired.

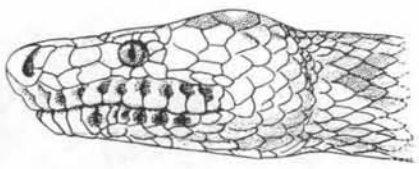


Phyllorhyncus browni

TANZER MEMORIAL FUND

As most of you know, Ernest Tanzer died on January 23, 1971, of a malignant lymphoma after a prolonged stay at M.D. Anderson Hospital in Houston, Texas. Ernest's wife, Glenda, gave birth to their daughter prematurely last August also at M.D. Anderson.

If you wish to contribute to a Memorial Fund to be presented to Glenda to help in the payment of the many debts incurred by his illness, please contact Dr. Robert B. Chiasson, Dept. of Biological Science, University of Arizona, or Dr. Howard K. Gloyd, Dept. of Biological Sciences, University of Arizona, Tucson, Arizona. Please make checks payable to Mrs. Glenda Tanzer.



Xenoboa cropani

BOOK REVIEW

THE HYLID FROGS OF MIDDLE AMERICA. By William E. Duellman, illustrated by David M. Dennis. 1970. Monograph, Mus. Nat. Hist., Univ. Kansas (1): 2 vol., xii + 753 p., 72 pl., 234 text-fig. $25.

It is a relatively rare event in this era of "modern" biology, with its overweaning emphasis on the fallacies of the philosophy of scientific materialism, reductionism and mechanism as adequate bases for relating to nature, its attempt to force the unique features of living systems into the outmoded explanations of 19th century physics and its ignorance of the complexity and emergent quality of biologic problems that are not readily fitted into laboratory analysis nor easily abstracted by mathematical models, to receive a substantial work in systematic herpetology that can once again awaken us to wonder at the mystery and diversity of life. The appearance of Bill Duellman's, THE HYLID FROGS OF MIDDLE AMERICA, affords such an opportunity for the reader who dares look upon it with openness to his or her own feelings.

When I first received my copy, it was with a sense of excitement that I rapidly scanned its pages, and began, as a herpetologist who has worked in these parts of the world and with many of these same wondrous creatures, to note the high quality of the study, its completeness, attention to detail, broad scope, and most of all, the detailed drawings (hands and feet and skulls of almost all species, all known tadpoles and their mouth parts) and the superlative plates based on living animals (all species; 31 color plates, 100 species) prepared by Dave Dennis. At the same moment, I sensed the profound feeling of achievement that the author must have felt upon seeing this culmination of nearly twenty years of work, including ten intensive years of field and laboratory study and five years in final preparation for publication. His accomplishment has required a single-minded purpose, devotion to arduous and time-consuming fieldwork, to the dullness and drudgery of laboratory workup and to perserverance in the face of opportunities for new experiences in other climes, which in the final stages of completion are so tempting to any author surfeit with reading and checking the same old section for another time. What a vast relief to lay that burden down! What a pleasure to see the finished work, not just as you imagined it to begin with, not just the way you would like it to appear, but done complete, a finished product of your own creation. At that moment the work is yours and no other's. Let the book reviewers and critics see it as they may, later on! They can never dilute, even with their acid barbs, your feelings of the moment. And simultaneously emerged my own memories of nights and days along some of the same jungle trails, with the clouds and rainy winds on the ridges of the mountains, the distant calls of unknown frogs, the friends and companions in the search; where suddenly, always unexpectedly, you catch a glimpse of a new part of yourself darting through the trees in the dark woods, passing as a shadow across the moonlit path, splashing down the glittering stream, roaring out of a fiery volcano, cascading down a waterfall, flying above the canopy top in the green valley below or playing hide-and-seek with the light and shadows among the fallen leaves on the forest floor.

And wondering after that whether a scientific, critical, judgemental review of a work that can evoke such feelings and memories isn't really out of place. What is the meaning of such a review, anyway? To cut off the anxiety of facing the new book forthrightly and experiencing it as it is for you, I suppose. After all, when the critical intellect looks at anything carefully it vanishes, and if someone else (a reviewer) will do the job, then most of the joy (or pain) of discovery can be drained away before you buy and you can avoid the chance of being surprised, bored, amazed or stimulated by your own response to the work. In effect, the reviewer can make the book vanish before you purchase it, a remarkably silly waste of everyone's time and your money. "Ah! But doctor, we respect your opinion of the work and wish to honor it by following your evaluation of its value, construction, artistry, and deficiencies." My reply to that is, if you really respect my opinion, then reach out to the experience of encountering this book, without benefit of someone else's scholarly phrase and well-turned, sly but acceptable, hostile wit. Make the book yours, let your feelings and memories flow -- and then decide if you like the book -- don't ask me to do it for you!

And having said all this, I will add that this book can be read, like all works of human creativity at several levels at once. To those who wish it to be so, the study is a modern taxonomic revision of the tree-frogs of Middle America based upon the features of external adult morphology, tadpoles, cranial osteology, chromosome numbers, breeding calls and geographic distribution; with copious illustrations of all stages and characteristics and distribution maps. In this regard, it is the first modern attempt to deal with a large taxonomic (Hylidae) and geographic (Middle America) segment of the New World tropical frog fauna and stands as a bright counterpart to the similar works on tropical African and Asian frogs prepared in the last twenty years by a series of distinguished herpetologists. At another level, it provides a basis for the comparison of ecologic zonation and diversification among the tropical tree-frogs, a dominant tropical forest-adaptive type, in South America, Africa, Madagascar, Asia, and New Guinea. The data in Duellman's work will have broad interest and can probably be utilized by others interested in tropical species problems.

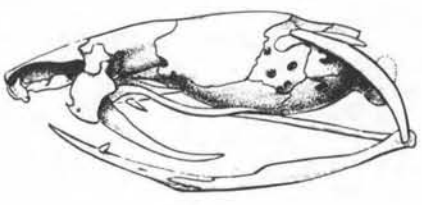
At still another level, the two volumes tell us much about the author, for although limited by the dry bone-yard conventions of scientific prose, this treatise like any creative work of art -- poetry, novel, essay or book review -- mirrors the inner world and imagination of its writer. And thus for those who can read the messages, Bill Duellman tells about his strengths, his weaknesses, his desires and aspirations, his hostilities and anxieties, his need for human warmth and appreciation, his need for acceptance, his pride of knowledge, his hope for immortality and his fear of death. All these things and more.

And at yet another level, what does this work contribute in the total context of biological knowledge? In tropical American herpetology, it is likely to remain an unassailable model for taxonomic works to come; a stimulus for different kinds of studies on these frogs than were possible prior to this work because of taxonomic chaos and ignorance of the opportunities provided by the diversity of adult, larval, ecologic and geographic patterns, now firmly elucidated. Perhaps it will also encourage herpetologists and ecologists elsewhere, interested in or living in the vast unexplored tropical world to new undertakings -- although the synthetic sections (pp. 654-693) that should provide such encouragement were not particularly stimulating for me, very probably because of my familiarity with the ideas and patterns discussed. But most likely very few others will take up the mundane approaches mentioned in the preface (p. vi.) of this work or follow these jungle trails to high adventure in search of golden frogs.

A hundred years from now, this monograph probably will have little significance to any but a few specialists studying the remnants of the world fauna. Its scientific appeals today are essentially only to those esoteric few who regularly peruse the HERPETOLOGICAL REVIEW. But even so, I can imagine in that not far-distant time, a young man or a young woman pulling down from the shelves in some dark archives, the dusty two volumes of this work, not checked out in forty years, and opening the yellowing pages to read the words and see the figures -- and at that moment being transfigured by emotion and stimulated to begin their own search for that experience that is life itself. And if these volumes do that for even one person, is it not enough?

JAY M. SAVAGE

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MEETINGS AND SOCIETIES

CALENDAR 1971

15-19 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Los Angeles.

19-22 August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Univ. New Mexico, Albuquerque (cosponsored by the HERPETOLOGISTS' LEAGUE).

29 August - 4 September....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Colorado State Univ., Fort Collins.

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Philadelphia (with AAAS; cosponsored by the SSAR).

INDIVIDUALS AND INSTITUTIONS

The NEW YORK ZOOLOGICAL SOCIETY, in a recent news release, states that it "has been forced to close permanently its WILLIAM BEEBE TROPICAL RESEARCH STATION in Trinidad" for financial reasons. It is also reducing the support for its research division, the INSTITUTE FOR RESEARCH IN ANIMAL BEHAVIOR.

The TEXAS NATURAL HISTORY COLLECTION (U Texas) now includes some 38,000 herpetological specimens. For information, write:

Robert F. Martin, Curator of Zoology
Texas Memorial Museum
University of Texas
24th and Trinity
Austin, Texas 78705

JAMES R. DIXON (Texas A&M U), with five students, made a herpeto-ecological transect of the Sierra Madre Oriental of Mexico last summer. He and JAMES F. SCUDDAY (Sul Ross St. Coll) are also investigating the ecology of six species of Cnemidophorus in West Texas.

WILLIAM E. DUELLMAN and THOMAS H. FRITTS (U Kansas) visited Peru in search of Marsupial frogs (Gastrotheca) in January.

CARL GANS will move from SUNY-Buffalo to the University of Michigan as Professor and Chairman of the Department of Zoology.

C. OdC. DIEFENBACH will also move from Buffalo to Michigan.

HOBART F. LANDRETH (Secty-Treas, Herpetologists' League) will move from Southwestern State College (Oklahoma) to the University of Oklahoma as Associate Professor of Zoology (half-time) and Research Director of the Oklahoma City Zoo.

CARIBBEAN RESEARCH PAGE

In December, 1970, HOWARD W. CAMPBELL, THOMAS PATTON, and PETER C. H. PRITCHARD (Univ. Florida, Gainesville, Florida 32601) traveled to Jamaica at the request of the Jamaican Government to examine the status of their crocodile populations. A recent rape of these populations by a group of Americans caused some concern to Mr. Bernard Lewis of the Institute of Jamaica, and Mr. Keats Hall (Jamaican Forestry Department). They asked Tom Patton, well-known in the area through his paleontological activities, to gather a group to evaluate the impact of the slaughter. They also requested recommendations for future protective legislation, if needed, and immediately imposed an embargo on crocodiles and crocodile products being shipped from the country.

The group was well received in Jamaica, and the project was given radio and TV coverage. A Jamaican air force plane and pilot were placed at their disposal, and boats and guides were made available for night work in the marshes. In three days they overflew the southern, western, and northwestern portions of the island, and developed a fair estimate of the distribution and quality of available crocodile habitat. They also talked with many natives to form an impression of the areas of greatest crocodile densities, and to assess the local attitudes toward the animals. The overall impression was that Government officials and local citizens are tolerant-to-favorable in their attitude toward crocodiles, and that the chief problem lies with components of the society (native and tourist) that require exotic sport to occupy their free time.

The hunting of this species on Jamaica has been moderate until recently, and they concluded from night visits to the marshes that C. acutus still exists in low-to-moderate numbers throughout the available habitat. It is nowhere abundant, as far as they could determine during their short stay. The group feels that proper management instituted in the next year or two could be effective in restoring populations sizable enough to permit moderate sport hunting or commercial cropping within a decade or less. Current hunting practices should be halted, and they recommended a two-year study to establish an ecological baseline for development of a sustained yield management/conservation program. Subsequent discussions with Jamaican officials revealed that the Government would support such a study with satisfactory personnel and in-country facilities. Campbell, Patton, and Francis Rose are making plans to initiate the study. [26 Apr 71]

RONALD I. CROMBIE (National Zoological Park, Smithsonian Institution, Washington, D.C. 20009) is working on the taxonomy of Antillean hylid frogs, with current emphasis on Jamaican species. He spent six weeks in Jamaica during the summer of 1970, gathering data on Hyla cruciallis, and plans to extend ecological and behavioral studies to the other Jamaican Hyla. Crombie is also collecting data on the eggs and larvae of all Antillean hylids, Bufo, and Leptodactylus, and has started tracing the history of introductions both into, and from the Antilles. He has recently summarized the status of introduced populations of Hyla squirella in the Bahamas (QUART J FLORIDA ACAD SCI, in press). In collaboration with Albert Schwartz, he is working on Hispaniolan hylids, the St. Lucia Hyla, and Aristelliger. [26 Apr 71]

JUDY STAMPS (Dept. Zoology, Univ. California, Berkeley, CA 94720) has been working on Anolis aeneus behavior for the past several years, in Grenada and the Grenadines. She is interested in film analysis of displays and field analysis of social behavior. [27 Apr 71]

W. MICHAEL CAREY (Dept. Biology, Univ. South Florida, Tampa, FL 33620) is researching the ecology and behavior of West Indian rock iguanas (genus Cyclura). To date he has studied in the field C. macleayi caymanensis and C. m. lewisi on the Cayman Islands (4 weeks, 1965); C. pinquis on Anegada, British Virgin Islands (6 weeks, 1968); C. cornuta and C. ricordii on Hispaniola (1 week, 1968); and C. inornata and C. figginsi on the Exuma Cays, Bahamas (3 weeks, 1970). He plans to visit all Cyclura populations in the West Indies eventually for additional ethoecological studies, and has launched (with Albert Schwartz) a systematic review of the genus. [26 Apr 71]

HOWARD W. CAMPBELL (Dept. Zoology, Univ. Florida, Gainesville, FL 32601) is conducting a short-term study of the acoustic behavior of Aristelliger praesignis. Campbell and Richard Franz will visit Jamaica and the Cayman Islands during the coming summer to obtain recordings and observations of the vocal activity of this species and to collect live specimens for further laboratory studies of their social behavior and auditory physiology. [26 Apr 71]

HERNDON G. DOWLING (Dept. Herpetology, American Museum of Natural History, New York, NY 10024, and "Dowling House," Port Maria, Jamaica) is preparing a loose-leaf CATALOGUE OF JAMAICAN AMPHIBIANS AND REPTILES in a somewhat less technical format than that of the "American Catalogue." He would appreciate contributions from persons with specific interests in the Jamaican fauna. [30 Apr 71]

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Membership is open to anyone interested in amphibians and reptiles.

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Write:
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Department of Biology
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Weatherford, Okla. 73096

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The Binder, Index Tabs, and all 100 accounts published to 1970 cost $18.00 to individuals, $20.00 to institutions. Subscription to the 25 accounts to be published in 1971 is an additional $5 for individuals, $7 for institutions.

Write:
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Herpetological Catalogue Comm.
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New York, N.Y. 10024

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Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be type-written on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $23.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/8 inches (one column) or 9 1/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 12 3/4 inches). Line cuts are reduced about 25 per cent in processing. [See also the special instructions for "Un-reviewed."]

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

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These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

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THE NEWSLETTER ON AMPHIBIANS AND REPTILES. . .
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ARTICLES

31 HERPETOLOGY ON THE MAIN, by Harry W. Greene. Herpetologists from twelve countries assembled in Frankfurt, Germany, for the sixth annual meeting of the DGHT.

35 EDWARD DRINKER COPE AND EVOLUTION, by Robert W. Reese & Marcos Arellano-Armenta. A letter to Alfredo Duges shows something of his thoughts in 1886.

UNREVIEWED-UNEDITED COMMUNICATIONS

37 CHROMOSOMES OF THE RHINOPHRYNID FROG, RHINOPHRYNUS DORSALIS DUMERIL & BIBRON, by Charles J. Cole.

39 AGONISTIC BEHAVIOR IN SOME CAPTIVE FROGS (RANA) FROM NEVADA, by F. H. Emmerson & F. R. Kay.

41 PERENNIAL COMMUNAL NESTING IN THE BLACK RACER (COLUBER CONSTRICTOR), by George W. Foley.

DEPARTMENTS

30 EDITORIAL

34 CONSERVATION NEWS

36 BOOK REVIEWS
Gilboa on "Control of growth and metamorphosis."
Gibson on Fukada's "Lives of snakes and frogs."

T9 CURRENT HERPETOLOGICAL TITLES

NEWS AND ANNOUNCEMENTS

40 Regional Societies Page
43 Meetings and Societies
43 Individuals and Institutions

SOCIETY NOTES

2 The Herpetologists' League
2 The Society for the Study of Amphibians and Reptiles
36 The 1971 Annual Meeting
T33 CALL FOR PAPERS AND ABSTRACT FORM.
42 SSAR Treasurers Report
43 Members Desiderata
44 Advice to Authors

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The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communications between amateur and professional workers.

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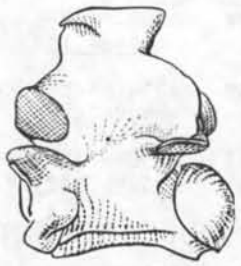
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EDITORIAL

First, I must apologize for ruining those photographs in the last issue. Lack of coordination between Editor and Printer caused some of them to appear at postage-stamp size. With the issue far past its deadline, I did not have the time to make the changes.



Our mailing house has just come through with the figures for the last mailing of HERPETOLOGICAL REVIEW:

Domestic.....	1,653
Canada.....	54
Other Foreign	209
TOTAL	1,916

This is far different from the some 700 of a couple of years ago (there were about 300 as-yet-non-paying CATALOGUE subscribers included in this recent mailing). Such a number (which includes about 500 institutions) should certainly be able to carry the financial load of the publications and services of an outstanding herpetological society. -- HGD.

HERPETOLOGISTS' LEAGUE

The Herpetologists' League is an international organization established by Major Chapman Grant in 1936. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1970 it had 940 members and fellows, 24 life members, 10 honorary members, and 400 institutional subscriptions to its journal, HERPETOLOGICA.

All persons interested in herpetology are eligible for membership. Dues are $8 for members, $10 for fellows. Institutional subscriptions to HERPETOLOGICA are $15.

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HERPETOLOGY ON THE MAIN

Harry W. Greene

During the first four days of October, 1970, herpetologists from Austria, Brazil, Denmark, France, East and West Germany, Great Britain, Italy, Luxembourg, The Netherlands, Switzerland, and the United States met in Frankfurt am Main for the sixth annual convention of the Deutsche Gesellschaft fuer Herpetologie und Terrarienkunde ("German Society for Herpetology and Terrarium Keeping"). The wide variety of subject matter covered and the diverse backgrounds of the participants combined to make this a meeting of international interest.

Registration began on Thursday evening in the Frankfurt Zoo's Serengeti Room, and was followed by what is known in the States as a "smoker." At this time each participant received a meeting packet and a special herpetological issue of Natur und Museum. The remainder of the convention was held in the recently completed Festsaal of the Senckenberg Museum, and was formally opened on Friday morning by society president Dr. Konrad Klemmer. Formal papers were delivered during three morning paper sessions. During coffee breaks and recesses, members were able to view exhibits of herpetological books and reprints, live amphibians and reptiles, and terrarium supplies on the first floor of the museum.

Friday afternoon was devoted to tours. One group, led by Dr. Klemmer, took in the herpetological exhibits and the research section of the Senckenberg Museum. In addition to the fossil displays and preserved material (almost 100,000 specimens, including about 550 types and a complete collection of Recent crocodilian skulls), this included a look at the Museum's long-lived pair of tuataras -- the male has now been in captivity more than eight years, the female more than six. Meanwhile, another group under the direction of Dr. Dieter Backhaus and Dr. Christoph Scherpner explored the Frankfurt Zoo. Of special interest there is the "Exotarium" (of which Dr. Backhaus is Director), with its fine amphibians and reptiles -- Rana /Conraua/ goliath, six species of monitor lizards (including the bright green Varanus prasinus from New Guinea and a young Komodo dragon), a pair of Oriental pipe snakes (Cylindrofus rufus), the red and brown Calabar ground python (Calabaria reinhardtl), and both genera of Madagascan boas (Acrantophis and Sanzinia) -- to mention only the more unusual exhibits. Undaunted by the inconvenience of one of Frankfurt's frequent rain showers, Frau Inge Schroeder guided a third tour through the world-famous Palmengarten (200 gardeners!).

Friday evening was occupied by three outstanding film presentations, introduced by Dr. Backhaus. The first, by Dr. Erhard Thomas (Mainz), explored the prey catching and feeding behavior of a constrictor (Elaphe longissima). Next, Dr. Klemmer narrated "Observations on the vertebrates of the Algerian Sahara," by Claude Grenot (Paris), who was unable to attend. This included footage of desert birds and mammals, but emphasized thermoregulatory behavior by reptiles. The final film of the evening, By Dieter Krammig (Frankfurt am Main), depicted a herpetological collecting trip through Morocco.

A business meeting was held on Saturday afternoon, and the following officers were elected for two-year terms: President -- Konrad Klemmer, Vice Presidents -- Friedrich Golder (Mainz-Mombach) and Erhard Thomas, and Treasurer -- H. J. Mann (Neu-Isenberg). Heinz Schroeder (Senckenberg Museum) was elected to serve as Editor of SALAMANDRA for the next six years. A discussion of finances was followed by a vote to raise the dues to DM 25 per year (about $6.90). Rene Honegger proposed that the membership pass a resolution governing the conditions under which they would import or purchase certain endangered amphibians and reptiles. This was given a vote of general approval, and referred to a committee for further consideration. With the society's business attended to, the meeting was recessed to a local restaurant for an evening of good food and fellowship.

The convention enjoyed a record attendance of 183 persons, and was judged a great success by all with whom I talked. Much of the credit for this must surely go to President Klemmer and his two fine assistants -- Fraeulein Borchers and Frau Oelkers -- and the members of the Frankfurt "Group" of the society.



FIGURE 1. In 1815 Johann Wolfgang von Goethe, Germany's most famous poet, suggested to his fellow citizens that they establish a natural history society and museum. The SENCKENBERGISCHE NATURFORSCHENDE GESELLSCHAFT was founded two years later, named for Dr. Johann Christian Senckenberg, an eighteenth-century physician. During this same year (1817), Dr. B. J. Roemer-Buechner, a member of the Society, published the first account of the natural history of Frankfurt and its environs. In 1821 the first Senckenberg Museum building was erected, and the present structure (above) was completed in 1907.
Successive contributions of three particularly energetic naturalists -- Eduard Rueppell (1794-1884), Oskar Boettger (1844-1910), and Robert Mertens (now Director Emeritus) -- have made the museum's herpetological collection one of the finest in the world today.

Abstracts of Formal Papers

(Translated and adapted from German summaries prepared by Konrad Klemmer for Rundbrief #27, Deutsche Gesellschaft fuer Herpetologie und Terrarienkunde)

Boehme, Wolfgang (Kiel). STUDIES ON LIZARDS OF THE FAMILY LACERTIDAE.

A study of lacertid hemipenes, based on both live and preserved material, demonstrated that the epithelial spines appear only during the mating season. Their development could be induced at other times by hormone injection. Developing, mature, and regressing spines could be distinguished, but only mature cells were used for systematic study. No intraspecific variation was observed. Interspecific differences did not seem to have any functional significance, and were considered useful for systematic study.

Color slides of various genera and species of Lacertidae were shown in the second part of presentation, and the systematics of various groups discussed. Special attention was given the genera Lacerta and Eremias. It was suggested that certain lower categories, such as the subgenus Archaeolacerta, are unnatural groupings. Implications of hemipenis structure for the status of L. princeps, L. peloponnesiaca, L. laevis, and L. chlorogaster were given.

Studer, Peter (Basel). EXPERIENCES IN REARING KOMODO DRAGONS.

The Basel Zoological Garden received six young Komodo dragons from the Djokjakarta Zoo, one of which later died. The young lizards, which still showed the conspicuous juvenile pattern, were kept together so that their social behavior could be observed. They were maintained in a climatically controlled room and fed small mammals and birds. An infection of Salmonella was treated with repeated high doses of Chloramphenicol. Color slides and growth charts were used to demonstrate adaptation to captivity and satisfactory development.

Kaestle, Werner (Muenchen). OBSERVATIONS ON AUSTRALIAN ANGLE-HEADED AGAMIDS OF THE GENUS GONOCEPHALUS.

Gonocephalus boydi and G. spinipes were kept in a richly planted, three-meter-square indoor terrarium. Horizontal or sloping tree limbs were preferred as resting places. The animals did not bask and did not require high temperatures (18 degrees C at night, 25 degrees C during the day). They spent long periods of time sitting motionless. Food was not pursued, but simply grasped when it came within reach. From several clutches (each 3-6 eggs), one young lizard was hatched after an incubation period of three months.

Lanza, Benedetto (Florence). A NEW BLUE ISLAND RACE OF LACERTA SICULA FROM SOUTHERN ITALY.

A population of blue ruin lizards (Lacerta sicula) has been discovered on a small island off the Lucanian coast of Italy which resembles the well known blue lizards of Faraglione (near Capri). The type description of the new race will appear in SALAMANDRA. It is smaller than the Faraglione lizard (L. s. coerulea) and also differs from it in details of scalation and coloration.



FIGURE 2. Dr. Klemmer discusses the skeleton of Iguanodon, a Cretaceous dinosaur, with a group of visiting members in the First Inner Court of the Senckenberg Museum

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Honegger, Rene (Zurich). THE PRESENT STATUS OF INTERNATIONAL EFFORTS TO CONSERVE ENDANGERED AMPHIBIANS AND REPTILES.

International cooperation will be necessary to intensify efforts to conserve amphibians and reptiles. The following steps have already been undertaken. In 1969 numerous sea turtle experts met at the offices of the International Union for Conservation of Nature and Natural Resources (IUCN) in Morges, Switzerland. The situation for all sea turtles is alarming, and consumers of sea turtle products have been informed of this on a worldwide basis. The New African Conservation Convention of September, 1969, ratified by numerous African countries, considered the establishment of new reservations, which would protect many amphibians and reptiles. The 1970 Endangered Species Act in the U. S. A. regulates the world-wide importation of endangered animals into that country, including amphibians and reptiles. The Tenth General Convention of the IUCN in New Delhi (1969) encouraged the governments of the Amazonian countries to restrict the export of their wildlife. National efforts to protect amphibians and reptiles must be strengthened. The buyers of these animals must be forced to cooperate and support efforts to conserve them.

Saint Girons, Hubert (Paris). ECOLOGICAL STUDIES ON CAMBODIAN SNAKES.

Observations gathered during travels in Cambodia were summarized. The habitats and adptations of various snakes were described and illustrated with color slides. Special emphasis was given to yearly cycles of reproduction, including maturation of ova and sperm, egg laying, and birth of young.

Mebs, Dietrich (Frankfurt am Main). WHY IS SNAKE VENOM POISONOUS?

Snake venom contains strong digestive enzymes and toxins. Toxins from Naja venom have been isolated several times in recent years, permitting clarification of their structures. An example is Cobrotoxin, from the venom of N. naja atra. It is composed of protein molecules, each consisting of 62 amino acids. These are arranged in unbranched chains, and a high proportion of basi amino acids is characteristic. The toxic nature of this venom reflects the sequence and arrangement of the different amino acids, and the spatial structure of the molecules. Like the arrow poison, curare, it acts on the end plates and halts the transmission of nerve impulses.

Clark, Richard J. (Molash, Kent, England, and Spetsai, Greece). THE SNAKES OF GREECE.

The zoogeography and regional distribution of Greek snakes was discussed. Morphological variation and comparative distribution of Coluber gemonensis and C. jugularis were described. Results of studies on the vipers of Greece (Vipera ammodytes, V. lebetina, and V. xanthina) were set forth, and their distribution reported. The Greek forms of Elaphe were discussed, and the specific status of E. rechingeri from the island of Amorgos considered.

Lanza, Benedetto (Florence). TRAVELS AS A NATURALIST IN EASTERN AFRICA.

Dr. Lanza's travels and observations in eastern Africa, especially in the Somali Republic, were illustrated with color slides. Of special interest were his photographs and comments on many rare or newly described reptiles.

Brodman, Peter (Ettingen). AMPHIBIANS OF THE BASEL REGION, AND STEPS FOR THEIR PROTECTION.

The amphibians fauna of the Basel region, including adjacent corners of Germany and France, is perhaps the richest of any comparable area in Western Europe. The author illustrated the various species and discussed their local distribution and habits. Suggested steps for conservation are as follows: protection of suitable breeding ponds, introduction of animals into appropriately constructed pools, cultivation of water plants, transfer of frog eggs, and protection of breeding migrations of frogs and toads from the dangers of highway traffic. For this last measure the author proposed drift fences to guide the animals through culverts under the roads. A special concern was the education of mankind, especially youth, about the biological significance of amphibians.

Hoogmoed, Marinus S. (Leiden). OBSERVATIONS ON THE FROGS AND LIZARDS OF SURINAM.

Dr. Hoogmoed discussed his observations on the distribution and ecology of the frogs and lizards of Surinam. His talk was supplemented with color slides and tape recordings of frog calls.

Stettler, Paul Heinrich (Ittigen/Bern). OBSERVATIONS ON CAPTIVE AMPHIBIANS AND REPTILES.

The speaker discussed and illustrated with color slides his observations on a number of rare or unusual amphibians and reptiles. Among others he mentioned, the treefrogs Hyla aurea and H. peronii and the appropriate terrarium for maintaining them in captivity; the unusual defensive behavior of Naultinus elegans, a New Zealand gecko; behavior and breeding of the agamid lizards Acanthosaura crucigera and Ceratophora tennentii; and the care and breeding of Erpeton tentaculatum, Acanthophis antarcticus, Atheris squamiger, Bitis caudalis, and Trimeresurus steinegeri.

Schultze-Westrum, Thomas (Assenhausen). AMPHIBIAN AND REPTILE HABITATS IN PAPUA.

Tropical amphibian and reptile habitats were discussed as they occur in New Guinea, including tropical rainforest, savanna, freshwater and brackish water swamps, and montane forests. Various amphibians and reptiles and their characteristic habitats were illustrated with color slides. Dr. Schultze-Westrum also discussed recent efforts to create a national park, and other protected areas in New Guinea were described. Problems associated with the introduction of Bufo marinus were mentioned, and possibilities for eradication or utilization (as "toad leather") of this species were suggested.



FIGURE 3. The internationally-known Frankfurt Zoo was first opened to the public in 1858. Shown here is a large lizard enclosure in the "Exotarium," a building housing marine invertebrates, fishes, amphibians, and reptiles.

CONSERVATION NOTES

AIMING AT ALLIGATORS ... The Louisiana Fish and Game Department is trying to crack the federal law protecting the endangered alligator so that it can sell $25 special hunting licenses to take alligators in the state. Could it be that $25 is not commercial when a state rather than an ordinary poacher collects it? (FROM MASS AUDUBON NEWSLETT)

PAPUA & NEW GUINEA

CROCODILES. A person shall not purchase crocodile skins or crocodiles, dead or alive, or engage in the trade of crocodile shooting for profit without a licence. The licence shall specify the number to be taken and the area in which the trade is to take place. The size limits may be designated. No living crocodile can be exported without consent of the Director of Agriculture, Stock & Fisheries. /BIOL CONSERV 2(1): 50./

MEXICO

RIDLEY SEA TURTLES. Peter Pritchard evaluates the status of the various populations: Lepidochelys kempi nesting on the coast of Tamaulipas, "safe from extinction if existing protection schemes can be continued." L. olivacea (Atlantic population): "Safe if protection at Surinam nesting beach is continued."

L. olivacea (Eastern Pacific population): "suffering a probably dangerous level of exploitation." [BIOL CONSERV 2(1): 13.]

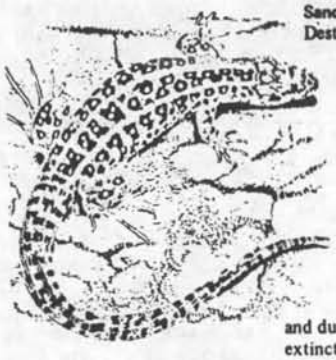
CUBA

CROCODILES. J. Groschaft (Inst. Parasitol., Czechoslovak. Acad. Sci., Prague) reports that both Crocodylus rhombifer and C. acutus are rare in nature, both on Cuba and the Isle of Pines. However, "numerous populations" of both species are bred in a special farm near Laguna del Tesoro (Zapata Peninsula, Las Villas Prov.).



AGAMA STELLIO. From an old photograph in the AMNH labelled, "Hugh S. Davis."

BRITISH ISLES



Sand Lizard in Danger
Destruction of its habitats on sandy heaths

and dunes is driving the sand lizard towards extinction in both Surrey and Lancashire, according to K. Corbett in the September *Oryx*. The larger of the two remaining Surrey localities, at Frensham, was recently destroyed by the Hambledon rural district council, in spite of a warning. In Lancashire the scheduling of another territory as a national nature reserve has not availed to avert a grave threat. The British Herpetological Society is now examining the position of the sand lizard in Britain as a matter of urgency, with a view to making recommendations for its conservation. (FROM ORYX)

RECENT PUBLICATIONS

RED DATA BOOK, Volume 3: Amphibia and Reptilia, compiled by Rene E. Honegger, 1970.

This volume is the first attempt to provide basic data on the status of rare and endangered amphibians and reptiles on a world-wide basis. Information is assembled in the form of short reports under a series of uniform headings. Adoption of a loose-leaf format allows any report to be replaced whenever new data warrants the publication of a more comprehensive or up-to-date sheet.

The volume may be obtained ($8.00) from:

The Director General
International Union for Conservation
of Nature and Natural Resources
1110 Morges, SWITZERLAND

SERPENTS DU LAOS, by J. Deuve, 1970. Bondy. 251 p., 32 pl., 18 fig., 3 maps. A systematic account of the 96 species that occur in Laos.

TEXTBOOK OF HERPETOLOGY, by C. J. & O. B. Goin, (Revised Edition) Freeman Co., 1971. We understand that this will be out on 15 March.

THE ZOOLOGICAL RECORD, Volume 105 (for 1968 literature). Amphibia ($6.00); Reptilia ($6.00).

Order from: Publications Department (HR)
The Zoological Society of London
Regent's Park
London, NW1, ENGLAND

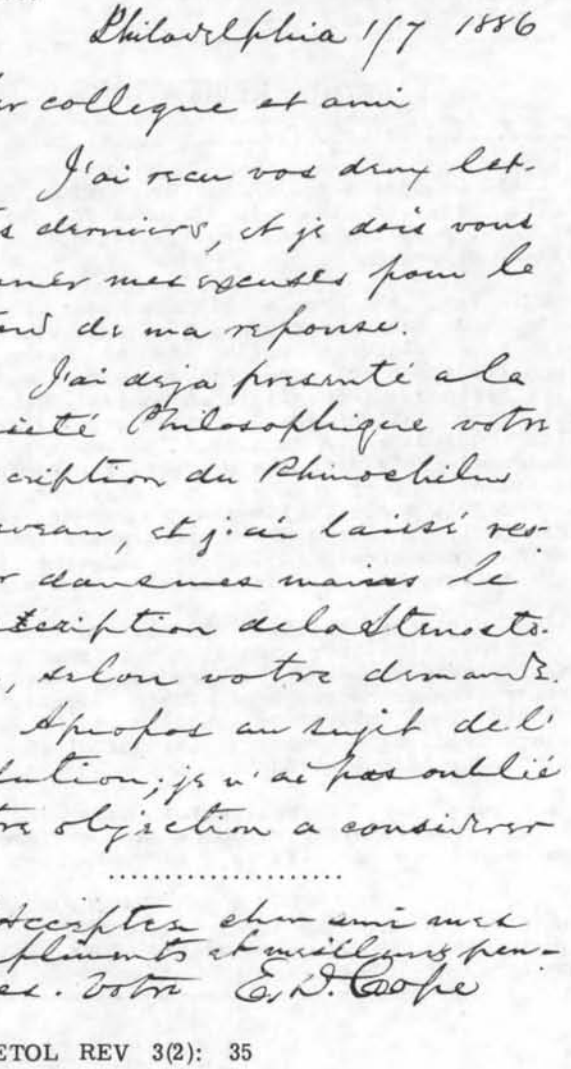
EDWARD DRINKER COPE AND EVOLUTION

Robert W. Reese & Marcos Arellano-Armenta

In a previous publication (Smith and Reese, 1969) the junior author (Reese) reported the opportunity to examine many items, now the property of St. Marcos Arellano-Armenta, from the personal library of Alfredo Duges. Among them were two items of particular interest.

Duges' personal copy of Elementos de Zoologia (1884) is bound with interleaves, and they are completely annotated. In chapter 41 entitled "Trasformismo", a word which we are unable to translate literally, but probably meaning mutability of species or perhaps even evolution, he debates the acceptability of the theories of Lamarck and Darwin in the notations of the interleaves. In these he cites the opinions of a number of men involved in the controversy. Opposite page 226 is the notation, in Spanish, "3 The illustrious paleontologist (and) evolutionist E. D. Cope in a letter dated July 1886, tells me: I believe that positive proof of evolution cannot be found in paleontology nor in embryology, but in the study of the specific characters of the living beings". This is followed by the distinctive signature of Duges.

Among the papers is the original of the letter from Cope. Part of it is reproduced here (fig. 1), and a translation is offered below. That Cope appears lamarckian in his viewpoint is of interest.



Philadelphia 1/7 1886

Cher collegue et ami

J'ai reçu vos deux dernières lettres, et je dois vous donner mes excuses pour le retard de ma réponse.

J'ai déjà presenté a la Société Philosophique votre description du Rhinochilus nouveau, et j'ai laissé rester dans mes mains la description de la Stenostoma, selon votre demande.

A propos au sujet de l'évolution, je n'ai pas oublié votre objection a considérer

.....

Acceptez cher ami mes compliments et meilleures pensées. Votre E. D. Cope

Translation of letter from E. D. Cope to A. Duges

Philadelphia 1/7 1886

Dear Colleague and Friend:

I received your last two letters, and I must make my excuses for the lateness of my reply.

I have already presented to the Philosophical Society your description of the new Rhinochilus, and I have kept in my hands the description of the Stenostoma, according to your request.

On the subject of evolution; I have not forgotten your objection to considering as affirmative evidence the variations of species, among other examples, the species of Sceloporus. You wish to take the variations as hybrids. But this explanation is impossible, because the varieties or subspecies are not living ordinarily in the same country, nor with each other nor with their possible ancestors. Such a mixture of species, would be for that reason impossible even if the hybrids were fertile, which is not the case ordinarily as you know. In fact the intermediate forms are often inhabitants of regions widely separated, forming geographic types.

I really believe that the positive proof of evolution is not to be found in paleontology nor in embryology but in the study of the specific characters of living animals. Nevertheless, the previously mentioned sciences document very important contributing evidence. Also, I do not believe that Mr. Darwin has a complete theory of evolution, but I think that Lamarck has started on a much broader foundation, in spite of some idealisms mixed into his precise theories.

I thank you for the small box of reptiles. I am very happy to have your Hemidactylus navarrii? with the others.

Mr. Boulanger has recently published the second volume of the catalog of the lizards of the British Museum. It contains a large number of American species, and you will find it very important for your studies. This work is the best which we have, in spite of some awkwardness in the definitions of the genera.

Accept dear friend my compliments and best thoughts.

Yours,

E. D. Cope

Literature Cited

Duges, Alfredo. 1884. Elementos de Zoologia. Oficina Tip. de la Secretaria de Fomento, Mexico. 479 pp.

Smith, H. M. and R. W. Reese. 1969. The second century of Alfredo Duges, father of Mexican herpetology. HERPETOL. REV. 7:5-7.

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next SSAR meeting

The Fourteenth Annual Meeting of the Society for the Study of Amphibians and Reptiles will be held at the University of New Mexico, Albuquerque, on 19-22 August 1971. The meeting will be co-sponsored by the Herpetologists' League.

The theme of the meeting will be THE ECOLOGY OF ARID-ADAPTED AMPHIBIANS AND REPTILES, with symposia and invited papers contributing to this subject.

Housing and meals will be available on campus, but such services are also found off-campus nearby.

Besides the prepared meetings, there will be a banquet, smoker, and field trips, with special activities planned for non-professional members and wives.

A CALL FOR PAPERS and an ABSTRACT form are enclosed on pages T-33 and T-34 of the CURRENT TITLES section of this issue.

These must be in the Editor's hands by 1 June, so that they may be printed in the pre-meeting, August issue of HERPETOLOGICAL REVIEW.

Additional information may be obtained from the Chairman of the Local Committee:

William G. Degenhardt
Department of Biology
University of New Mexico
Albuquerque, N. M. 87106



A herpetologist's dream come true, a granddaughter with a pair of fangs. (Photo: Elazar Kochva.)

BOOK REVIEW

CONTROL OF GROWTH AND METAMORPHOSIS: Part II of ANIMAL HORMONES - A COMPARATIVE SURVEY. By Penelope M. Jenkin. 1970. Pergamon Press, Oxford, xviii + 383 p., 81 fig., 26 tab.

This volume, a continuation of part I: KINETIC AND METABOLIC HORMONES (1960), to which the reader is frequently referred, reviews the sources and actions of those hormones influencing growth, molting and metamorphosis in annellids, gastropods, cephalopods, several group of arthropods, and all classes of vertebrates. The text is well illustrated and indexed, with a list of references appearing at the end of each chapter.

It is a nice addition to a reading list for senior undergraduates in zoology and physiology. However, publishing houses like Pergamon would better serve the scientific community if they adopted the American Standard for Periodical Title Abbreviations: Z 39.5-1963 (American National Standards Institute, Inc., New York). This would eliminate inconsistencies in abbreviating the titles of journals.

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BOOK REVIEW

LIVES OF SNAKES AND FROGS. By Hajime Fukada. 1970. Natural History in Pictures for Children. No. 10. Amphibians and Reptiles. Senshukai Co., Osaka, Japan.

This is a children's picture book of some common Japanese amphibians and reptiles. There are some pictures which may be used for identification of species and some depicting life history. Emphasis is on snakes and frogs, but some salamanders, turtles and lizards are also included. A separate commentary (in Japanese) explaining the pictures and containing additional photographs is provided. Also provided is a most welcome mimeographed English translation. Although in the translation there are numerous errors in spelling and some quaint phraseology, the meaning generally is clear.

The pictures by Izumi Tamai are especially appealing. They have a sketchiness, particularly in the backgrounds, that adds, rather than detracts, from their appeal. The animals look alive and, because of the subdued colors used, have a naturalness not often found in children's animal books.

I found this a delightful book and feel certain that it will introduce many children to amphibians and reptiles in a very pleasant way.

FRANCES W. GIBSON

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THE AMERICAN MUSEUM OF NATURAL HISTORY
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CURRENT HERPETOLOGICAL TITLES, XIV: 1970

Herpetological Information Search Systems
American Museum of Natural History
New York, N. Y. 10024

We have brought to your attention some 13,000 current titles in the pages of this journal to date.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts-Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses especially.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1970-1971) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW has appeared bimonthly, beginning in 1971. This means that the titles published here will be even more current. Further, the added issues will serve to reduce the titles-per-issue to a more manageable number.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 1 January 1971 through 1 March 1971. Periodical title abbreviations follow the American Standard for Periodical Title Abbreviations Z 39.5-1963 (American National Standards Institute, Inc., New York).

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and L. Greene. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. Dr. Robert W. Winter provided us with translations of titles, abstracts and papers from Slavic languages. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 30 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

HERPETOLOGICAL
INFORMATION
SEARCH
SYSTEMS



LATE NOTICE

HISS has just received word that its NSF grant has been cut by more than $40,000 (almost 40%) for the current year -- due to massive cuts in NSF funds for this division. We were warned that next year would not be any better.

We are not calling for donations or letters of appreciation, but we do hope that readers will subscribe to the new publications and services which we must initiate this year to help close the gap between production costs and monies available.

Notice of these new operations will appear in the next issue of HERPETOLOGICAL REVIEW

HERPETOLOGICAL
INFORMATION
SEARCH
SYSTEMS



- A -

ACTON,RONALD T., PETER P.WEINHEIMER, MICHAEL WOLCOTT, E.EDWARD EVANS and J.C.BENNETT
1970. N-terminal sequences of immunoglobulin heavy and light chains from three species of lower vertebrates.
NATURE (LONDON) 228(5275):991-992, 2 tab.

ADLER,KRAIG
1970. The influence of prehistoric man on the distribution of the box turtle.
ANN CARNEGIE MUS 41(9):263-280, 1 fig., 1 tab.

AISENSTADT,T.B. and M.N.SKOBLINA
1970. The fine structure of frog oocytes maturing in vitro under the ineluence of hypophyseal hormones after the removal of their germinal vesicles.
TSITOLOGIYA 12(6):713-717, 1 fig. (Russ, Engl summ)

ALBARET,JEAN-LOUIS
1970. Observations cytologiques sur les nyctotheres des genres Prosicuophora de puytorac et oktem et Sicuophora de puytorac et grain, cilies parasites de batraciens anoures d'Afrique noire. Description de deux especes nouvelles.
PROTISTOLOGICA 6(2):183-198, 28 fig. (Fr, Engl summ)

AMENTA,PETER S.
1970. Nucleocytoplasmic relationships and cell to cell contract phenomena studied by ultraviolet microbeam irradiation.
AMER ZOOL 10(3):323-324. (abstr)

ANASTASI,A. and G.FALCONIERI ERSPAMER
1970. Occurrence of phyllomedusin, a physalaemin-like decapeptide, in the skin of Phyllomedusa bicolor.
EXPERIENTIA (BASEL) 26(8):866-867.

ANASTASI,A., G.BERTACCINI, J.M.CEI, G.DE CARO, V.ERSPAMER, M.IMPICCIATORE and M.ROSEGHINI
1970. Presence of caerulein in extracts of the skin of Leptodactylus pentadactylus labyrinthicus and of Xenopus laevis.
BRIT J PHARMACOL 38(1):221-228, 4 tab.

ANDERSON,JAMES D.
1970. Description of the spermatophore of Ambystoma tigrinum.
HERPETOLOGICA 26(3):304-308, 1 fig., 1 tab.

ANDRIEUX,B. and A.COLLENOT
1970. Hormones gonadotropes et developpement testiculaire chez le triton Pleurodeles waltlii Michah. hypophysectomise.
ANN ENDOCRINOL 31(3):531-537, 6 fig., 1 tab.
(Fr, Engl summ)

ANDRY,MICHAEL L.
1970. Behavior and brain activity of snakes.
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FOURTEENTH ANNUAL MEETING
SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES
co-sponsored by
THE HERPETOLOGISTS' LEAGUE
University of New Mexico, Albuquerque
19-22 August 1971

C A L L F O R P A P E R S

The theme of the meeting will be THE ECOLOGY OF ARID-ADAPTED AMPHIBIANS AND REPTILES. However, papers on any herpetological subject are welcome. We would prefer that papers presented orally refer to work in progress or nearing completion. Presentation of results that have been published or that are in press usually are a waste of time for both author and audience.

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Populations of the salamander Desmognathus ochrophaeus inhabiting wet, vertical rock faces in the vicinity of Mt. Mitchell, North Carolina were sampled and the information on size and age at maturity was compiled. Individuals were found to mature at smaller size at greater elevation and at a given elevation individuals were found to mature at smaller body sizes than they do in nearby woodland populations. Two population inhabiting rock faces at 5025 and 3590 feet above sea level yielded sample sizes sufficient to permit determination of age at maturity and juvenile growth rates from juvenile size-frequency distributions. In the higher elevation population sexual maturity is attained at larger body sizes, which in turn are attained by delaying the sexual maturity about one year relative to its occurrence in the lower population. The juvenile growth rates of the two populations are similar to one another and to those estimated for nearby woodland populations.

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Write most abstracts in a single paragraph. Normally employ complete, connected sentences, active verbs, and the third person. Use nontextual material such as short tables and structural formulas only when no acceptable alternative exists. Employ standard nomenclature, or define unfamiliar terms, abbreviations, and symbols the first time they occur in the abstract.

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CHROMOSOMES OF THE RHINOPHRYNID FROG, RHINOPHRYNUS DORSALIS DUMERIL AND BIBRON

Charles J. Cole

Rhinophrynus dorsalis is the only Recent representative of the American family Rhinophrynidae. Some of its morphological characteristics appear to be primitive and others appear derived. Consequently, the relationships of the Rhinophrynidae to other families of frogs are obscure (Hecht, 1963). The karyotype of Rhinophrynus dorsalis is presented here with the hope that these data may be useful sooner or later in determining its relationships.

Chromosomes of 31 bone marrow cells at mitotic metaphase were examined on slides prepared by means of the colchicine, hypotonic citrate technique used by Cole, Lowe, and Wright (1968). The four frogs (two of each sex) from which chromosomes were examined were collected by James Bockowski and Manuel Rubio in the Isthmus of Tehuantepec, along Highway 190 between Tehuantepec and Juchitan, Oaxaca, Mexico, on 3 August 1970. The specimens are in the amphibian collection of the American Museum of Natural History (AMNH 84256-84259). I am grateful to the collectors for contributing the live frogs for this investigation, to Philip V. Colbert for assistance in the field, and to Richard G. Zweifel for criticizing the manuscript.

Rhinophrynus dorsalis has a diploid number of 22 chromosomes: 14 (seven pairs) are large and eight (four pairs) are distinctly smaller (Fig. 1). Of the larger chromosomes, number 7 is metacentric, numbers 1, 2, and 5 are metacentric to submetacentric, and numbers 3, 4, and 6 are conspicuously submetacentric. Chromosomes 3, 4, 5, and 6 are rather similar in length, and thus, excepting number 5 which has a distinctive shape, they are often difficult or impossible to distinguish from one another. Of the four pairs of smaller chromosomes (none of which is small enough to qualify as a microchromosome), numbers 8, 9, and 11 are submetacentric, whereas number 10 is subtelocentric (nearly telocentric). In most cells, each of the pairs of smaller chromosomes is individually recognizable. Number 11, clearly the smallest, is also distinguished from the other small submetacentrics by virtue of its relatively shorter short arm. Number 10 is the only pair of subtelocentrics. Although numbers 8 and 9 are similar in size and shape, one of them (designated as no. 8 here) has a distinctive, consistent secondary constriction in the long arm near the centromere (Fig. 1). No pair of chromosomes is heteromorphic. The karyotype presented here is consistent with the chromosome number for Rhinophrynus dorsalis (n = 11) recently reported by Leon (1970).

Most students of anuran phylogeny agree that the following four Recent families are the most primitive: Ascaphidae, Discoglossidae, Pipidae, and Rhinophrynidae. Also, various authors consider that rhinophrynids have their greatest affinities with the pipids, although the relationship is not considered to be very close. It is of interest now, therefore, to compare the chromosomes of Rhinophrynus with those of representatives of these other presumably primitive families.

ASCAPHIDAE.-- Karyotypes of two species have been described and illustrated: Ascaphus truei ($2n$ = 42 or 44; Wickbom, 1950a; Morescalchi, 1967) and Leiopelma hochstetteri ($2n$ = 34 or 23; Morescalchi, 1968a). In neither Ascaphus nor Leiopelma do the karyotypic data suggest affinities with Rhinophrynus.

DISCOGLOSSIDAE.-- Karyotypes have been described and illustrated for Alytes obstetricans ($2n$ = 36 or 38) and Discoglossus pictus ($2n$ = 28) (Wickbom, 1949; Morescalchi, 1966). Also, chromosomes have been examined in three of the four species of Bombina ($2n$ = 24; Wickbom, 1949; Makino, 1951; Morescalchi, 1965, 1966). The chromosome morphology of Rhinophrynus is most similar to that of Bombina and Discoglossus, although the resemblance is not particularly close, and there is a difference in chromosome number.

PIPIDAE.-- Chromosomes of two African species have been examined: Xenopus laevis ($2n$ = 36; Wickbom, 1949; Mikamo and Witschi, 1966) and Hymenochirus boettgeri ($2n$ = 24; Morescalchi, 1968b). Two American species have been examined also: Pipa parva ($2n$ = 30 telocentric chromosomes; Morescalchi, 1968b) and Pipa pipa ($2n$ = 22; Wickbom, 1950b). Only in the case of Pipa pipa, among the pipids, is the karyotype similar to that of Rhinophrynus dorsalis. Not only do these two species have the same number of chromosomes ($2n$ = 22), but P. pipa also has chromosomes of similar sizes. The biggest reported differences in the chromosomes of these two species are in a number of centromere positions; Wickbom (1950b) reported that the seven smallest pairs of P. pipa are telocentric. These differences, however, may not be so large as they presently appear, because Wickbom did not have modern equipment and techniques available for his work. He did not use colchicine, for example, which provides clear recognition of centromere positions, and

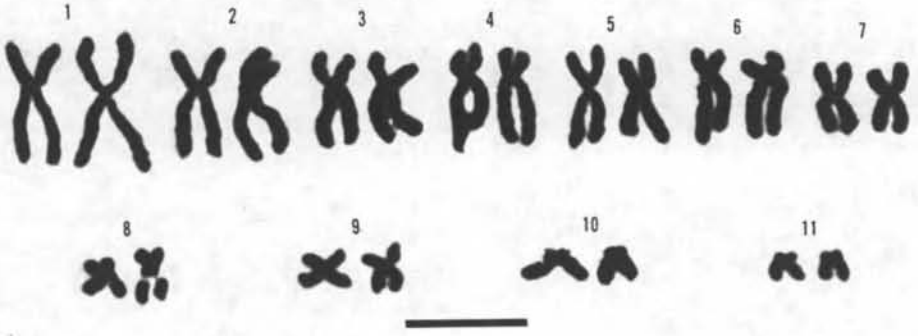


Fig. 1. Representation of the karyotype ($2n$ = 22) of a female specimen of Rhinophrynus dorsalis (AMNH 84256).

consequently his indications of centromere positions were sometimes inaccurate; this was most frequent with smaller chromosomes. Thus, the karyotypes of Pipa pipa and Rhinophrynus dorsalis might be extremely similar. It is, therefore, of considerable interest to obtain new preparations of the chromosomes of P. pipa, as well as of other pipids.

OTHER FROGS.-- Considering all other species of frogs that have been karyotyped and for which closely comparable illustrations are available, the species having karyotypes including 2n = 22 chromosomes (or x = 11 in polyploids) that strongly resemble those of Rhinophrynus are all members of the Leptodactylidae. The similarities in many cases include a secondary constriction on chromosome number 8, with conspicuous differences only in some details of centromere positions. The following leptodactylids have similar karyotypes: Leptodactylus bufonius, L. melanonotus, L. ocellatus, L. pentadactylus, Macrogenioglottus alipioi, Odontophrynus americanus, O. carvalhoi, O. cultripes, O. occidentalis, Physalaemus cuvieri, P. fuscomaculatus, P. pustulosus [reported as Engystomops pustulosus], and eight species of Pleurodema (Barrio and de Chieri, 1970; Becak, Becak, and Rabello, 1966, 1967; Becak, Becak, and Vizotto, 1970; Becak, Denaro, and Becak, 1970; Becak, Becak, and de Langlada, 1968; Bianchi and Molina, 1967; Bogart, 1967; Morescalchi and Gargiulo, 1969).

Other species of anurans that have the same chromosome number as Rhinophrynus dorsalis (2n = 22) do not also have such similar chromosome morphology, and thus they are not considered further here.

Thus, the karyotype of Rhinophrynus dorsalis, considered with reference to the karyotype data available for other anurans, does not necessarily validate placing the Rhinophrynidae among the most primitive frogs. A more definitive statement awaits the study of additional American pipids by modern methods.

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UNREVIEWED-UNEDITED COMMUNICATIONS

AGONISTIC BEHAVIOR IN SOME CAPTIVE FROGS (RANA) FROM NEVADA

Frederick H. Emmerson & Fenton R. Kay

Brode (1959), Blair (1963), Durham and Bennett (1963), Emlen (1968), Schroeder (1968), and Weiwandt (1969) have observed combat in Rana clamitans and Rana catesbeiana associated with territories of calling males. Test (1954) observed agonistic behavior associated with feeding in Phylobates trinitatus. He noted that subadults and adults, predominantly females, aggressively defended their streamside feeding stations. Brattstrom and Yarnell (1968) reported territorial defense in Leptodactylus melanotus that increased when food was introduced into the experimental terraria. We observed agonistic interactions during feeding of captive Rana sp. (near pretiosa) from Duckwater, Nye County, Nevada.

Two groups of nine frogs were initially placed in ten-gallon glass terraria, containing a moist sand terrestrial substrate and water to a depth of one inch. The frogs were later transferred to two 30 x 30 in. areas in a galvanized metal container, 9 in. deep. Each partition contained sand, wheat seedlings, and a shallow enamel pan, 12 x 8 in., set flush with the soil surface. The frogs were maintained on a diet of mealworms (Tenebrio sp. larvae), wingless fruit flies (Drosophila melanogaster) and occasional cockroaches (Periplaneta americana).

Upon presentation of food (mealworms distributed on the sand or in petri dishes) the frogs attacked one another, biting, butting, and pouncing squarely upon one another. Even in the presence of excess food, aggression persisted to the extent that the frogs often did not feed. Preoccupation with combative behavior was such that many mealworms crawled off and ceased to be available as food. Occasionally a pair of frogs would grapple for possession of a single mealworm, with the food alternating between animals several times before being consumed. On several occasions frogs attacked the single tiger salamander (Ambystoma tigrinum) housed for a time with one of the groups. These attacks occurred as the salamander moved from place to place as the frogs fed.

Ritualized sequences of behavior were not seen, but on a few occasions one frog postured to another in a manner similar to the "challenge" posture figured by Weiwandt (1969) or the "attention" posture figures by Brattstrom and Yarnell (1968). On only one occasion was the second frog observed to assume what appeared to be a submissive posture. The usual end to a display was active biting and kicking by one frog or the other.

The larger frog of any sparring pair was not necessarily the initiator of aggressive behavior, nor did it always succeed in driving away the smaller animal. There was no observable difference in aggressive proclivities between male and female or mature and immature frogs. No dominance relationships were evident at any time.

Over a period of months, frogs were removed from each group. Agonistic behavior remained prevalent in the face of diminishing group size. A single adult pair was kept for several months in a 15-gallon terrarium and was fed on a flat rock. Combat continued to occur, but not with every feeding.

Hediger (1950) has classified animals as continuous or occasional feeders. Rana in nature would fall into the continuous category. In effect, these captive frogs were forced by the conditions of captivity, to become occasional feeders. Although the temptation existed to structure a study in which the frogs' agonistic behavior could be quantified, we felt that the resulting data would say little, if anything, about the life style of the animals in nature. Moreover, behavior in captivity is subject to change by manipulation of variables. We found, for example, that presentation of a different prey item elicited a different style of feeding activity. When cockroaches, and to a lesser extent fruit flies, were presented, the frogs hopped about in pursuit of these active, climbing insects, in contrast to gathering around a dish of relatively inactive mealworms. No combat was observed as the frogs fed on cockroaches, and very little when they were fed fruit flies.

We thank Dr. James E. Deacon for providing laboratory facilities during this study, and Dr. Ralph J. Raitt and Steven J. Bissell for reviewing the manuscript.

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REGIONAL SOCIETIES PAGE

Since the publication of the list of Herpetological Societies, Amateur & Professional (HERPETOL REV 2(3): 6-9), a committee of SSAR has been formed for liaison with regional Herpetological societies. Members of this committee (John S. Applegarth, Arden Brame, J. T. Collins, James R. Dixon and I. Gilboa, Chairman)have already established contact with many of the societies in order to formulate a program of services and activities. Here is a supplementary list of new societies:

Bi-State (NY and NJ) T. and T. Soc. (William Galluccio, 96-35 Corona Ave., Corona, NY 11368).

Iowa Herpetological Society (Henry Wallace, 147 Tonawanda Dr., Des Moines, IA 50312).

Kentucky Herpetological Society (Eddie Ashmore, Box #2, 2825 Lexington Rd., Louisville, KY 40206).

Nevada Herpetological Society (Bill Cobb, Jr., 4909 Eugene Ave., Las Vegas, NV 89108 or Lendre Embree, 6229 Factor, Las Vegas, NV).

New Mexico Herpetological Society (John S. Applegarth, Dept. of Biol., Albuquerque, NM 87106). Membership dues $1.00 per year. A well-spent dollar for their informative NEWSLETTER.

Pacific Northwest Herp. Soc. (Ernie Wagner, Woodland Park Zoo, 5400 Phinney Ave., Seattle, WA 98107). Regular membership dues $5.00, students or subscribers $2.00 per year. They publish a Bulletin irregularly.

West End Reptile Association (St. George's Church, 300 West D St., Ontario, CA 91761).



CALIFORNIA TURTLE & TORTOISE CLUB
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WESTCHESTER CHAPTER: Meets on the 4th Friday of every month at the Alondra Park Headquarters Bldg., 3850 Manhattan Beach Bl., Lawndale, CA. Time: 7:30 to 10:00 PM (opens at 7:00 PM).

FOOTHILL CHAPTER: Meets on the 1st Friday of every month at the Glendale Federal (Community Room), 2350 Honolulu Ave., Montrose, CA.

MEMBERSHIP: $5.00 yearly, individual; $10.00 yearly family (2 or more). These include subscription to the TORTUGA GAZETTE; subscription only, $4.00 per year.

SOUTHWESTERN HERPETOLOGISTS SOCIETY

The Southwestern Herpetologists Society was founded in 1954 in Orange County, Calif. An early purpose was to encourage and inspire young herpetologists. Twelve years later, in September 1966, the San Gabriel Valley Branch of the Society was formed. In June 1967, the San Fernando Valley Herpetological Society voted to become the San Fernando Valley Branch of the Southwestern Herpetologists Society. These three branches comprise the present structure of the Society. The Constitution and Bylaws of the Society were printed in the March 1970 issue of HERPETOLOGY, the Society's quarterly publication. The Society is an unincorporated association, although an effort is being made to have it approved as a nonprofit corporation.

ORANGE COUNTY BRANCH: Meets on the 4th Wednesday of every month (except Dec.) at the Isaac Walton League Bldg., 1714 Santa Clara, Santa Ana, at 7:30 PM. Secretary-Treasurer: Randy Limburg, 318 E. Redwood, Orange 92667; phone (714) 637-4906.

SAN GABRIEL VALLEY BRANCH: Meets on the 2nd Wednesday of every month at the Eaton Canyon Nature Center, 1750 N. Altadena Dr., Pasadena, at 7:45 PM. Visitors most welcome. Secretary-Treasurer: Don Griffith, P.O. Box 2054-D, Pasadena 91105. Phone (213) 794-1866 (Nature Center).

SAN FERNANDO VALLEY BRANCH: Meets on the 3rd Monday of every month at the Reseda Recreation Center Bldg. (2nd fl.), 18411 Victory Blvd., Reseda, at 7:30PM. Secretary-Treasurer: Betty Reynolds, 2890 Rock St., Simi 93065, phone (805) 526-0918.

MEMBERSHIP: Unlimited member, $5.00; family member, $3.00 (for additional members in same household); commercial member, $5.00, plus 10% of sales at meetings; subscribing member, $3.00.

RAY PAWLEY is the recently elected president of the Chicago Herpetological Society.

A special double issue of HERP (Bull. New York Herpetol. Soc.) 6(3-4) is dedicated to the American ALLIGATOR. Issued in 1971, it includes reprints of papers by R. L. Ditmars and K. P. Schmidt.

UNREVIEWED-UNEDITED COMMUNICATIONS

PERENNIAL COMMUNAL NESTING IN THE BLACK RACER (COLUBER CONSTRICTOR)

George W. Foley

Communal nesting behavior has been reported for only four species of North American snakes. Blanchard (1930, 1936) records nests of the eastern ringneck snake (Diadophis punctatus edwardsi) containing eggs deposited by a number of individuals. Presence of shell fragments in some nests indicated use of the same sites for at least three consecutive seasons. Instances of communal nesting for the smooth green snake (Opheodrys vernalis) are noted by Stille (1954), Cook (1964), and Fowler (1966). Lynch (1966) records a group of 76 eggs of the pilot black snake (Elaphe o. obsoleta), plus shells from the previous year; other shell fragments, possibly from two years before, were found nearby. Evidence of communal nesting in the eastern fox snake (Elaphe vulpina gloydi) is presented by Patch (1919, p. 60), who notes "apparently, several individuals sometimes place their eggs in the same site, as on one occasion three specimens and half a bushel of eggs were found under a section of log." A somewhat similar experience with the same species is recorded in the field notes of Dr. and Mrs. Max Hecht (pers. comm.). Approximately 150 eggs, estimated by Dr. Hecht to represent eight clutches, were found within a single log.

On July 13, 1963, I found three nesting sites of the northern black racer (Coluber c. constrictor) near Sterling Furnace, Orange County, New York. The sites, located upon an old concrete foundation several feet in height, were partially obscured by grasses and other low plants growing in the soil and cinders mixture that formed a broad platform at the edge of a wooded tract. Eggs had been deposited beneath pieces of plywood lying fifteen to twenty feet apart. Two groups of eggs were barely sheltered by separate pieces of wood approximately 2 feet square; the third and largest group was concealed beneath a 4 x 3 foot section partially covered with earth. One site contained 22 eggs and more than 12 shells from the year before. The second contained more than 20 eggs and a similar number of year-old shells. The third site contained about fifty eggs and somewhat more than 50 shells from the previous season. The first and third sites were photographed on July 17 by Richard G. Zweifel (Figs. 1, 2).

The first group of 22 eggs was collected and incubated by means of the plastic bag technique (Zweifel, 1961); all hatched on August 16. Twenty-one hatchlings were released at the nesting area in early September. All eggs left in situ had hatched, but a careful search of the surrounding area at the time produced no hatchlings. On a subsequent visit on May 30, 1965, I found ten or twelve shells of 1964 vintage under the larger shelter. The other two shelters had rotted away during the intervening months.

Fitch (1963) records an average of 16.8 eggs per clutch for the northern racer based on 14 sets of 7 to 31 eggs each. Therefore, the two individual groups of about 20 eggs may have represented single clutches, but the larger complement resulted from the efforts of at least two and possibly three females. Thus, these observations document the use by Coluber c. constrictor of the same nesting sites for minimum periods of two and three years respectively, and show communal nesting at one site for two years.

LITERATURE CITED

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Department of Herpetology
AMERICAN MUSEUM OF NATURAL HISTORY
New York, NY 10024
/Received 4 March 1971./

****



(Fig. 1). Communal nesting site containing eggs and year-old shells of Coluber constrictor.

S S A R TREASURER'S REPORT 1970

INCOME

Balance from 1969 (from J.T.Collins)		$490.69
For the Blanchard Fund		150.00
	sub-total	$640.69
Dues and subscriptions:		
586 US members		$3538.00
66 Non-US members		340.39
166 Institutional		1676.00
	sub-total	$5554.39
Contributions:		
79 Sustaining		$158.00
11 Contributing		99.00
Bojanus donations		200.27
	sub-total	$457.27
Sales:		
Author reprints		$238.90
Herp. Review ads		310.00
Large facsimiles		2592.58
Small facsimiles		273.25
Journals		509.40
Herp. Reviews		127.08
	sub-total	$4051.21
Interest:		
On savings account		$144.47
On life account		117.67
	sub-total	$262.14
TOTAL RECEIPTS FOR FISCAL 1970		$10965.70

EXPENSES

Office of Journal of Herpetology		
Vols. 4 (1-2) and (3-4)		$3804.79
TC Vol 3		115.95
Copyrights		12.00
Reprints		62.00
	sub-total	$3994.74
Office of Herpetological Reviews		
Vol 2 (1,2,3,4)		$1599.74
Mail and freight		184.79
	sub-total	$1784.53
Office of Facsimile Reprints		
Bojanus		$1937.58
Boulenger 10 and 11		485.00
Sowerby ads.		33.95
	sub-total	$2456.53
Office of the Secretary		
Postage		$42.00
Xerox		35.20
Phone		42.40
Ballots		14.25
Letterheads		19.57
Miscellaneous		5.40
	sub-total	$158.82
Office of the Treasurer		
Bankbook		$5.41
Typing		12.00
Letterheads		52.53
Envelopes		116.12
Postage		174.12
Bank charges		1.09
Bad checks		42.00
Refunds		33.00
	sub-total	$436.27
Office of Publications Secretary		
Postage		$159.74
Manila envelopes		32.12
Rubber stamps		6.38
Herp. Rev. 6-reprinted		102.71
	sub-total	$300.95
Office of Assistant Publications Secretary		
Envelopes		$136.20
Postage		325.06
	sub-total	$461.26
Annual Meeting		$195.90
IBM Typewriter (3rd installment)		100.00
	sub-total	$295.90
TOTAL EXPENDITURES FOR FISCAL 1970		$9889.00

SUMMARY

Receipts for 1970	$10965.70
Expenditures for 1970	9889.00
Balance	$1076.70

Cash on hand, 1 January 1971, Athens, Ohio	
In reserve fund	$926.70
In Blanchard Fund	150.00
Advance 1971 subscriptions	4382.36
Advance facsimile sales	1060.00
Total cash	$6519.06

Life Membership		
49 members - 14 at $100		$1400.00
2 at 75		150.00
8 at 50		400.00
25 at 25		625.00
	sub-total	$2575.00
INTEREST		+ 142.64
	total	$2717.64
Transferred to Athens account		- 117.67
Balance in Lawrence, Kansas		$2599.97



IMPORTANT NOTICE
Camp's "Classification of the Lizards"

Because of the extended postal service shutdown in England this past winter, the reprinting of Camp's lizard book will be delayed slightly due to the interruption of communication between the editor and Dr. Garth Underwood, who has written the introduction. It is anticipated that subscribers' copies will be mailed during summer 1971.

The Society regrets this inconvenience.

K. Adler, Editor
Facsimile Reprints in Herpetology

MEETINGS AND SOCIETIES

CALENDAR 1971

12-16 April....FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Annual Meeting, Chicago.

15-17 April....ASSOCIATION OF SOUTHEASTERN BIOLOGISTS, Annual Meeting, Richmond, Virginia.

23-25 April....SYMPOSIUM ON, "The world of reptiles," University of California, Berkeley (see p. 40).

23-24 April....SOUTHWESTERN ASSOCIATION OF NATURALISTS, Annual Meeting, Fayetteville, Arkansas.

1-2 May....JOSHUA TREE TURTLE RACES, Joshua Tree, Calif.

23 May....7th ANNUAL CALIFORNIA TURTLE & TORTOISE CLUB SHOW, Pasadena.

15-19 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Los Angeles.

19-22 August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Univ. New Mexico, Albuquerque (cosponsored by the HERPETOLOGISTS' LEAGUE). /See pp. 36, T-33./

29 August - 4 September....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Colorado State Univ., Fort Collins.

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Philadelphia (with AAAS; cosponsored by the SSAR).

INDIVIDUALS AND INSTITUTIONS

NEWARK MUSEUM OF NATURAL HISTORY. "The collection of tailless amphibians was increased by a gift of Australian frogs by Daniel C. Wilhoft, a gift of frogs of the southern United States by Douglas Rossman, and a number of California specimens obtained from Anthony J. Gaudin. The salamander collection was augmented by a selection of salamander life history material donated by James D. Anderson.

"An excellent collection of snakes from the New Jersey Pine Barrens was received from Robert Brandner." [MUS N S (NEWARK) 1969: 55]

DAVID B. WAKE (Mus. Vert. Zool., U. Cal.) was elected Chairman of the ASZ's Division of Vertebrate Morphology. Among his students, ex-students and collaborators, are RON LAWSON with whom he co-authored a monograph on the vertebral column of Eurycea bislineata, RICHARD WASSERSUG, who is studying the feeding mechanisms of anuran larvae, JAMES L. EDWARDS who is studying the evolution of the neck region in salamanders, and RICHARD WORTHINGTON, who is working on a morphometric analysis of regional variation in salamanders. R. ERIC LOMBARD recently completed his doctoral work on an evolutionary analysis of the auditory and vestibular elements of the inner ear of salamanders.

MEMBERS DESIDERATA

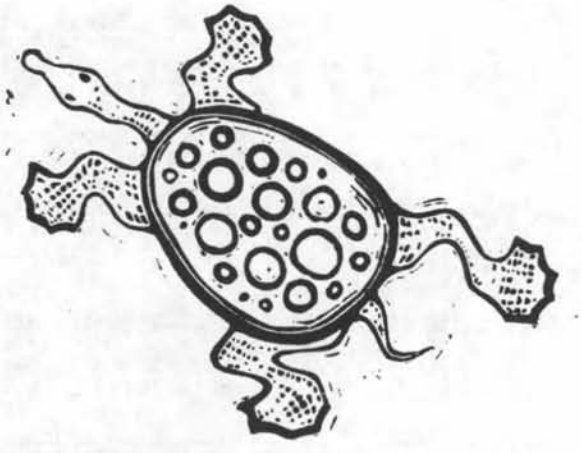
JOSEPH T. COLLINS (Mus. Nat. Hist., Univ. Kansas, Lawrence, Kansas 66044) would like to obtain a set of Holbrook's "North American Herpetology" (either first or second edition). He will trade Daudin's eight-volume "Reptiles" and Guenther's "Reptiles of British India," plus other selected volumes.

THOMAS G. ZACCONE (Dept. Zoology, Univ. Rhode Island, Kingston, R.I. 02881) would like to obtain living specimens of Heterodon platyrhinos, H. nasicus, H. simus, Farancia abacura, F. erytrogramma, and Pseudoeryx plicatilis for karyotyping. Locality data would be appreciated.

RECENT DEATHS

ERNEST C. TANZER (Bryan, Texas) died of cancer, 23 January 1971.

JOHN ALLEN RAHNIS (Maryland Herpetol Soc.) died as a result of an automobile accident, 19 January 1971.



CHANGES OF ADDRESS

HISS now provides mailing lists for the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES and the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES. With this issue, the HERPETOLOGISTS' LEAGUE mailing list has also been added to our computerized file.

PLEASE SEND CHANGES OF ADDRESS for any of these activities directly to us, we will inform the appropriate officers.

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS
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American Museum of Natural History
Central Park West at 79th St.
New York, N.Y. 10024

ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be typewritten on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $16.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/8 inches (one column) or 9 1/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 12 5/8 inches). Line cuts are reduced 25 per cent in processing.

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.

****

UNREVIEWED-UNEDITED COMMUNICATIONS

****

"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

****

This section is supported entirely by its authors and their sponsors. Page charges pay the costs of publication, distribution, and 100 author's reprints. Illustrations may be included but must be reduced to proper dimensions (see Advice to Authors).

Page charges are: $20 for a single page (148 lines of about 40 characters and spaces); $40 for the two-page maximum (300 lines). Include an allowance for the title and author's name and five lines for the address and received date. Send a check for the proper amount with the manuscript, or if you prefer, we will bill you that amount for reprints.

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THE NEWSLETTER ON AMPHIBIANS AND REPTILES...
AND THE PEOPLE WHO STUDY THEM

VOLUME 3, NUMBER 1
FEBRUARY 1971

Herpetological Review

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HERPETOLOGISTS' LEAGUE

by

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS

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●CONTENTS

ARTICLES

4 REPORT ON THE SSAR KANSAS CITY MEETING, AUGUST 1970.
The program and abstracts of papers are given here.

UNREVIEWED — UNEDITED COMMUNICATIONS

15 CHROMOSOMES OF A NEW GUINEAN MICROHYLID FROG, COPHIXALUS RIPARIUS ZWEIFEL, by C. J. Cole & R. G. Zweifel.

17 ON THE PROBLEMS OF HOME RANGE MEASUREMENT AND INDIVIDUAL RECOGNITION IN LIZARD ECOLOGY STUDIES, by William W. Milstead.

18 AN INSTANCE OF CANNIBALISM IN CROTALUS LEPIDUS (SERPENTES: CROTALIDAE), by Michael A. Williamson.

DEPARTMENTS

2 EDITORIAL

3 A LETTER TO THE MEMBERSHIP
Gordon and Tanner announce SSAR-HL cooperation.

25 CONSERVATION NEWS
Pritchard gives another report on Galapagos Tortoises.

24 BOOK REVIEWS
McCoy on Webb's Oklahoma work.
Gilboa on EEG.

T1 CURRENT HERPETOLOGICAL TITLES

HERPETOLOGISTS RECORD
17 Zug will edit page on new geographic information.
18 McCoy will edit page on Caribbean research activities.

NEWS AND ANNOUNCEMENTS
19 Regional Societies Page
20 Meetings and Societies
20 Individuals and Institutions
22 Brazilian Expedition Permits

SOCIETY NOTES
2 The Herpetologists' League
2 The Society for the Study of Amphibians and Reptiles.
20 Members Desiderata
21 Lost Members
28 Advice to Authors

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S S A R

The Society was founded in 1958 as THE OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

The SSAR encourages the acquisition of knowledge on amphibians and reptiles, and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communications between amateur and professional workers.

Membership is open to anyone interested in amphibians and reptiles. Regular dues are $8, Foreign $6, Sustaining $10, Contributing $15, Life $150. Institutional subscriptions are $16. Address inquiries about subscriptions and membership to the Treasurer.

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EDITORIAL

****

With this issue of HR we welcome an additional 650 members and subscribers of the HERPETOLOGISTS' LEAGUE (those who are not also members of SSAR). As indicated on this page and elsewhere, the cosponsorship of HR was one of the steps taken by the societies at the December meetings in Chicago.

It has been our hope that HR would become truly a newsletter for all people interested in amphibians and reptiles, rather than just the organ of a single society. The action in Chicago has brought HR a giant step toward this goal.

Another act of the SSAR Board provides an additional step in this direction. It voted to allow individuals who are not members of either society to subscribe separately to HERPETOLOGICAL REVIEW. Therefore, this number is being mailed to some 300 subscribers of the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES that are not HL or SSAR members -- just to show them what they have been missing. We are hopeful too that the new possibility of separate subscription will allow HR to expand its circulation in the regional and specialized societies. We hope also to gain subscribers among the many ecologists, embryologists, physiologists, parasitologists, and others who work with reptiles and amphibians, but who do not consider themselves herpetologists. At least "Current Titles" should be of interest to all. If the "fringe groups" provide news items, etc., as well, the gain will be mutual.

Three new Departments are introduced in this issue. A "Geographic Distribution Page" is intended for new information on amphibian and reptile distribution, and the correction of erroneous information. A "Caribbean Research Page" will provide information on current research projects and other herpetological activities in this very active region. Perhaps of most importance on a long-term basis is the initiation of a "Regional Society Page," intended to provide a place for recording the activities of some of the smaller herpetological associations. We are hopeful that members who are interested in these various aspects of the field will find time to contribute to these new sections.

Other departments are under consideration and some (e.g., karyotype records) are under development now. The broader base of our new readership should provide even greater opportunity for development. Your suggestions and aid will be greatly appreciated. -- HGD.

****

HERPETOLOGISTS' LEAGUE

The Herpetologists' League is an international organization established by Major Chapman Grant in 1936. It is dedicated to furthering knowledge of the biology of amphibians and reptiles.

In 1970 it had 940 members and fellows, 24 life members, 10 honorary members, and 400 institutional subscriptions to its journal, HERPETOLOGICA.

All persons interested in herpetology are eligible for membership. Dues are $8 for members, $10 for fellows. Institutional subscriptions to HERPETOLOGICA are $15.

Address the Secretary-Treasurer for information on membership and subscriptions.

****

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Mississippi State Univ.
State College, Miss. 39762

To the Members of the Herpetologists' League and SSAR:

You may have noticed that the current issue of Herpetological Review bears a statement on the masthead of joint sponsorship for its publication. In December, 1970, at separate meetings, and later by committees in joint session, the governing boards of the two organizations approved an exploratory program to identify areas and activities in which interaction might bring about improvement in the several services offered to the herpetological community. In addition to joint sponsorship of the Herpetological Review for 1971, reciprocal invitations to co-host the Albuquerque meeting of SSAR, August 19-22, and the Philadelphia meeting of H L, during the week, December 26-31, will be made.

To examine the implications of long range interaction, and the possibility of a joint meeting for 1972, the governing boards established a committee consisting of three members from each organization. Full reports of the committee's recommendations will be made to the membership of the two societies in August and again in December. The East and West locations of the two meetings strongly increases the possibility that a significant number of members of the two societies will attend at least one of the two meetings, and thus be on hand to discuss the Committee report.

In the meantime, both of us would appreciate any comments you might care to offer concerning the above action and suggestions for specific ways and means of implementing cooperative action designed to strengthen the communicative aspects of herpetology, both oral and published.

Robert E. Gordon
Chairman, SSAR
University of Notre Dame

Wilmer W. Tanner
President, H L
Brigham Young University

Besides the President of HL and the Chairman of SSAR, who serve ex officio, the following were appointed to the committee mentioned above:

Representing the SSAR

KRAIG ADLER
Department of Biology
University of Notre Dame
Notre Dame, Ind. 46556

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Norman, Okla. 73069

As indicated, V. H. Hutchison was elected Chairman of the committee at its first meeting.

SSAR'S KANSAS CITY MEETING

One hundred and sixty-five persons, from 31 states and 8 nations, attended the Society's Thirteenth Annual Meeting 27-30 August 1970 at the University of Missouri - Kansas City. The meeting was dedicated to guest of honor Edward H. Taylor in recognition of his major contributions to herpetology. Society Chairman Ronald A. Brandon opened the meeting by introducing our hosts: Richard Armitage, UMKC Provost and Dean of Faculties; Wesley J. Dale, Dean of the School of Graduate Studies; Henry A. Mitchell, Associate Dean of the College of Arts and Sciences; and Harold C. Burdick, Acting Chairman of the Department of Biology. Provost Armitage welcomed the Society to the campus.

The highlight of the meeting was the symposium on "Evolutionary Biology of Anurans," organized by James L. Vial, Kraig Adler and William E. Duellman. It was supported financially by UMKC and presided over by W. Frank Blair. The consistently excellent presentations, containing some of the most significant papers on the subject in recent years, were followed by energetic discussions. A symposium volume edited by Dr. Vial, will be published by the University of Missouri Press.

Twenty-four additional papers were presented during sessions presided over by William W. Milstead, Roy W. McDiarmid and M. J. Fouquette. Abstracts of these papers follow this report.

The Board of Directors met Friday evening in a long and significant session. Several committees were authorized to make recommendations to the Board regarding: 1) selection of future meeting sites, 2) financial planning, 3) liaison with regional herpetological societies, 4) liaison with national herpetological societies, 5) SSAR history and membership campaign brochure, and 6) Society publications. Other important action included: 1) selection of the University of New Mexico, Albuquerque, for the August 1971 14th Annual Meeting; 2) increasing of dues for regular members from $6.00 to $8.00, for sustaining members from $8.00 to $10.00, for foreign members from $5.00 to $6.00, and for institutional subscriptions from $10.00 to $16.00; 3) to increase Herpetological Review from 4 to 6 issues a year; 4) decision to publish abstracts of papers given at our annual meetings in Herpetological Review; 5) a policy to distribute a list of SSAR members and their addresses to all members of the Society. Other items of business were referred to appropriate committees for preparation of recommendations to a mid-year meeting of the Board which was held in Chicago during the December 1970 meetings of AAAS.

At the Business Meeting on Saturday morning, a resolution prepared by the Committee on Conservation (N. Bayard Green, Chairman, M. Graham Netting, and Glenn Gentry) was read and approved:

"RESOLUTION -- Whereas the Society for the Study of Amphibians and Reptiles, concerned with the future of the North American fauna, views the introduction, intended or unintended, of foreign reptiles and amphibians into the continent, and especially the United States and its possessions, as a threat to our native species, and also views with concern any effort to introduce our native species into other parts of the world.

"Be it resolvad that the Society for the Study of Amphibians and Reptiles urges the United States Fish and Wildlife Service, and the various state departments of fish and game, to desist from introduction into the United States and its possessions of exotic wildlife, and to concern themselves with the betterment of our native wildlife and the saving of its habitats; and

"Be it further resolved that the Society for the Study of Amphibians and Reptiles deplores the lack of emphasis on the potential long-term adverse evolutionary consequences of the introduction of exotic species that has marked past introductions and present attempts at introduction of game and pet species, some of which represent taxonomic groups not compmising a part of our native fauna; and

"Be it further resolved that the Society for the Study of Amphibians and Reptiles supports the effective control of the importation of amphibians and reptiles by the United States government and its agencies, and the enactment of appropriate legislation regulating responsible and proper confinement and security of imported species."

Robert E. Gordon, Chairman of the Resolutions Committee, presented the following motion which was approved:

"The Resolutions Committee moves that the Society express its appreciation to:

1) Dr. Jamas Vial and his colleagues, William Milstead, Thomas Berger, Donald Smith, James Stewart, Cathy Ewert, Cathy Hunt, Roger Jensen, Linda Folkman and Paul Anderson, all members of the local committee, for their dedication and effort that insured the great success of the 13th annual meeting.
2) The University of Missouri - Kansas City for provision of the excellent facilities and helpful services in support of scholarly activity on the biology of amphibians and reptiles.
3) The Symposium participants for their stimulating and enthusiastic contributions on the state of our knowledge of anuran evolution. We look forward to the publication of this survey of contemporary anuran biology."

The Banquet and Social were held Saturday evening at the Roundtable Restaurant.



Presentation of the guest of honor award to Edward H. Taylor (right) by SSAR Chairman Ronald A. Brandon (left) and Meeting Chairman James L. Vial.

MEETING PROGRAM

THURSDAY, AUGUST 27. AM.

REGISTRATION: University Student Center (Main Lobby).

CALL TO ORDER: Ronald A. Brandon (S. Illinois Univ.), Chairman of the Society.

Welcome: Richard Armitage, Provost and Dean of Faculties, UMKC.

Introduction of Sponsors:

Wesley J. Dale, Dean, School of Graduate Studies, UMKC.

Henry A. Mitchell, Associate Dean, College of Arts and Sciences, UMKC. Harold C. Burdick, Acting Chairman, Department of Biology, UMKC.

SYMPOSIUM:
EVOLUTIONARY BIOLOGY OF ANURANS.

W. Frank Blair (University of Texas), Presiding.

SESSION I. THURSDAY. PM.

Introduction: Major Problems in Anuran Evolution. W. Frank Blair (Univ. Texas).

Origin and Early Evolution of Anurans. Richard Estes (Boston Univ.) and Osvaldo Reig (Univ. Central Venezuela) (Presented by Estes).

Bones, Frogs and Evolution: A Phylogenetic Dilemma. Linda Trueb (Univ. Kansas).

Transition from Archaic to Advanced Frogs. John D. Lynch (Univ. Nebraska).

Biochemical Techniques and Problems in Anuran Evolution. Sheldon I. Guttman (Miami Univ. Ohio).

Panel Discussion: Joseph A. Tihen (Univ. Notre Dame), Moderator. R. Estes, O. Reig, L. Trueb, J. Lynch, and S. Guttman; Discussants.

SYMPOSIUM. SESSION II.
FRIDAY, AUGUST 28. AM.

Evolution of Mating Behavior. George B. Rabb (Chicago Zool. Park).

Evolution of Reproductive Adaptations. Stanley N. Salthe (Brooklyn Coll., New York) and William E. Duellman (Univ. of Kansas) (Presented by Salthe).

Evolutionary Patterns in Larval Morphology. Priscilla Starrett (Univ. S. California).

Ecological and Behavioral Adaptations of Anuran Larvae. Richard Wassersug (Univ. California Berkeley).

Panel Discussion: Robert F. Inger (Field Museum of Natural History), Moderator. G. Rabb, S. Salthe, W. Duellman, P. Starrett and R. Wassersug; Discussants.



Participants in SSAR Symposium on "Evolutionary Biology of Anurans." ROW 1 (seated left to right): Arne Schiotz, Sheldon I. Guttman, Priscilla Starrett, W. Frank Blair, Linda Treub, Stanley N. Salthe, James P. Bogart. ROW 2: Jay M. Savage, John D. Lynch, George B. Rabb, Ian Straughn, Dean E. Metter, Richard Estes, Robert F. Inger, Richard Wassersug, David J. Merrell, William E. Duellman, Osvaldo Reig. Not shown: Joseph A. Tihen.

SYMPOSIUM. SESSION III. FRIDAY. PM.

The Geographic Distribution of Frogs: Patterns and Predictions. Jay M. Savage (Univ. S. California).

Evolution of Karyotypes. James P. Bogart (Univ. Texas).

Evolution of Mating Calls: Bioacoustical Considerations. Ian Straughn (Univ. Coll. Townsville, Queensland, Australia).

Evolution of Mating Calls: Ecological Considerations. Arne Schiotz (Danmarks Akvarium, Charlottenlund, Denmark).

Ecological Genetics of Anurans. David J. Merrell (Univ. Minnesota).

Panel Discussion: Dean E. Metter (Univ. Missouri-Columbia), Moderator. J. Savage, J. Bogart, I. Straughn, A. Schiotz and D. Merrell; Discussants. Concluding Remarks: W. Frank Blair.

FRIDAY EVENING.

BOARD OF DIRECTORS MEETING: University Student Center (Alumni Lounge).

CONTRIBUTED PAPERS
SESSION I. SATURDAY, AUGUST 29. AM.

William W. Milstead (UMKC), Presiding.

Further studies on serological relationships among colubrid snakes. Sherman A. Minton and Sylvia K. Salanitro (Indiana Univ. Med. Center) (Presented by Minton).

Two more toxic salamanders: Ambystoma maculatum and Cryptobranchus alleganiensis. Edmund D. Brodie, Jr. (Clemson Univ.).

Comments on boid (Serpentes) relationships. Herndon G. Dowling (Amer. Mus. Natur. Hist.).

Aggressive behavior among Costa Rican anoline lizards. Anthony A. Echelle, Alice F. Echelle (Univ. Oklahoma) and Henry S. Fitch (Univ. Kansas) (Presented by Echelle).

Effect of cyclic injections of melatonin on the biological clock of larval Ambystoma tigrinum. Douglas H. Taylor (Univ. Notre Dame).

Natural hybridization between Bachia intermedia and Bachia barbouri (Sauria: Teiidae). James R. Dixon (Texas A & M Univ.).

Comparative studies on activity patterns of Desmognathus quadramaculatus and Leurognathus marmorata. James L. Vial and James R. Stewart (UMKC) (Presented by Stewart).

Physiological comparisons of desert and montane populations of Ambystoma tigrinum. Jeff Delson and Walter G. Whitford (New Mexico State Univ.) (Presented by Delson).



CONTRIBUTED PAPERS
SESSION II. SATURDAY. PM.

Roy W. McDiarmid (Univ. S. Florida), Presiding.

Geographic variation of Ameiva undulata (Sauria: Teiidae.) Arthur C. Echternacht (Boston Univ.).

A serum protein study of Ozark Cryptobranchus. Edward Wortham and Max A. Nickerson) Arkansas State Univ.) (Presented by Wortham).

Toward a quantification of the ecological niche. Wm. W. Milstead (UMKC).

A comparative study of the body movements of displaying males of the lizard genus Sceloporus (Iguanidae). James R. Purdue (Univ. Oklahoma).

Squamation in caecilians. Edward H. Taylor (Univ. Kansas).

A new species of Batrachoseps (Slender Salamander) from the desert of Southern California. Arden H. Brame, Jr. (Eaton Canyon Nature Center).

Display behavior of Sceloporus horridus. Louis J. Bussjaeger (Univ. Oklahoma).

Development of tadpoles of Hyla gratiosa and Hyla femoralis. Ronald Altig (Mississippi State Univ.).

Special Illustrated Presentation: The Ozarkian Wildlife Region. Leland Payton (Sedalia, Missouri).

CONTRIBUTED PAPERS
SESSION III. SUNDAY, AUGUST 30. AM.

M. J. Fouquette (Arizona State Univ.), Presiding.

The ecology and distribution of Eurycea longicauda melanopleura and Eurycea lucifuga in western Missouri. H. Patrick Woolley (East Central Junior Coll. Missouri).

The formation of tadpole holes. Jeffrey H. Black (Univ. Oklahoma).

Seasonal movements and home range of Desmognathus fuscus throughout an annual cycle. Ray E. Ashton, Jr. (Miami Univ. Ohio).

Hybridization experiments involving Ambystoma dumerilii. Ronald A. Brandon (South Illinois Univ.).

Concerning the taeniata group of the genus Tantilla (Serpentes: Colubridae). Alan H. Savitzky and Hobart M. Smith (Univ. Colorado) (Presented by Savitzky).

The comparative courtship behavior of Chrysemys concinna suwanniensis and Chrysemys scripta elegans. John D. Davis (Mississippi State Coll. Women) and Crawford G. Jackson, Jr. (San Diego State Coll.) (Presented by Davis).

Analysis of discontinuous variation in the Central American snake Scolecophis atrocinctus (Colubridae). Stephen R. Edwards (Univ. Kansas).

Noteworthy records of reptiles and amphibians from the southeastern United States. Bruce Means (Florida State Univ.).

ALTIG, RONALD (Miss. State U.). Development of tadpoles of Hyla gratiosa and Hyla femoralis.

Development of laboratory-reared tadpoles of Hyla gratiosa and Hyla femoralis from Okaloosa County, Florida was followed from gastrulation until rear limb buds appeared. Emphasis was placed on color pattern development. The larva and premetamorphic tadpole of H. gratiosa has a unique striped and banded pattern that develops at about the time the eye appears, and this pattern is distinct from that of the prometamorphic tadpole. The prometamorphic tadpole undergoes considerable diel color change. The striped pattern typical of H. femoralis tadpoles does not fully develop until some time after the operculum closes. At first the tail musculature is bicolored. Later the lateral and dorsolateral light tail stripes are delimited, and the light dorsolateral body stripe is obliterated.

These patterns are probably important in camouflage. H. gratiosa tadpoles undergo an ontogenetic behavioral change.

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ASHTON, RAY E. JR. (Miami U.). Seasonal movements and home range of Desmognathus fuscus throughout an annual cycle.

Thirty-five Dusky salamanders were tagged with Cobalt-60 (35-50 microcuries) and their movements monitored with a survey meter and scintillation probe. Distances moved, temperature of air, water, and substrata were taken each time the animal was located.

Average home range was calculated to be 1.67 meters squared with the largest area being 3.6 meters squared. The longest movement in one week was 10.2 meters, in twenty-four hours, 1.5 meters.

Winter movement was centered around underground spring and seepage areas where the temperature never dropped below 3°C. Average depth of these areas was about 30 cm. As many as fifteen adult Desmognathus fuscus were found in a 20 cm. squared area of one such retreat. These areas were composed of gravel and small pieces of limestone around which there was a constant flow of water. All salamanders found in this area seemed quite active.

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BEZY, ROBERT L. (Los Angeles County Mus. Nat. Hist.). Systematic problems in the family Xantusiidae (Sauria).

Highly disjunct local populations with varying degrees of morphologic divergence make difficult the task of defining evolutionarily meaningful (or even morphologically consistent) species units in the family Xantusiidae. Selective pressures for saxicolous adaptations have led to morphologic convergence at the subspecies, species, and near-generic levels. Data on karyotypic variation, when considered together with morphologic, biogeographic, and ecologic information aids in the solution of generic and species problems in this small but puzzling family.

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BLACK, JEFFREY H. (U. Oklahoma). The formation of tadpole holes.

Tadpole holes are circular depressions formed in soft layers of silt and fine sand in the bottom of shallow ponds. These are interesting features to geologists as they may be buried, fossilized, and preserved in the fossil record. Their formation has been attributed to interference ripple-marks, gregarious fish and tadpoles.

During the past 3 years in Oklahoma, over 30 temporary pools and the tadpoles inhabiting them have been observed. Tadpole holes were not present until May, 1970, during which time their formation was observed in a pool basin newly formed by road construction, 15.5 miles east of Norman, Cleveland County, Oklahoma. Numerous circular depressions with a diameter of 23 to 57 mm and a depth of 5 to 15 mm were regularly spaced over nearly the whole bottom of the pool. These circular depressions were made by the feeding activities of Bufo americanus charlesmithi and Pseudacris streckeri tadpoles. Depressions were further developed by aquatic beetles, snails and fairy shrimp.

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BLAIR, W. FRANK (U. Texas). Major Problems in Anuran Evolution.

Two main themes are discussed. One addresses the accuracy of presently existing schemes for classifying the Anura, especially the higher categories, and the accuracy of our presently existing knowledge of the evolutionary history of the anuran taxa. The second theme concerns the suitability of anurans as material for elucidating evolutionary principles and mechanisms.

The multidisciplinary approach is stressed. Anurans are very well suited for the study of karyotypes, genetic compatibility, behavioral isolating mechanisms including those of mating call difference and response, and biochemical differences in such things as skin secretions and blood proteins. Added to the conventional characters of external morphology, osteology and myology, the sum of all of these attributes gives confidence in the conclusions that can be drawn.

Several examples of the utility of the modern methods in improving anuran classification are cited, as are potential sources of error if too few kinds of information are used.

Examples from Bufo are used to illustrate the utility of the multidisciplinary approach in establishing best estimates of the area of origin and history of spread of a particular taxon.

Possible utility of anurans toward a better understanding of the meaning of latitudinal gradients in species diversity and of the mechanisms of speciation of tropical animals are discussed.

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BOGART, JAMES P. (U. Texas). Evolution of Karyotypes in Anurans.

Recent advances in methodology combined with an increased sampling of species enables us to come to a better understanding of the evolution of karyotypes in the Anura. Chromosome numbers in themselves are not sufficient information. Some species with the same chromosome number may be distantly related while other species in the same genus may have varying numbers. Several types of chromosal mutation may be demonstrated in the Anura.

Knowledge of karyotypic variation in some groups is helpful in understanding the evolution of the various genera and species. Karyotypic examination of large numbers of species and genera often reveals interesting patterns and relationship. The family Hylidae may be taken for an example. Chromosome numbers vary in this family from 18 to 52 (2n). Most of the karyotypes may be derived from a basic leptodactylid karyotype which has 26 chromosomes. In the genus Hyla, there are three major chromosomal groupings which would indicate very distant relationships for these groups. Other groups of species which have been given generic status are chromosomally very similar to species of Hyla and possibly do not warrant generic distinctness. It is often possible to group species on the basis of karyotypic similarity.

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BRAME, ARDEN H. JR. (Eaton Canyon Nature Center). A new species of Batrachoseps (Slender Salamander) from the desert of Southern California.

The surprising discovery was made in the late summer of 1969, of a population of Batrachoseps living in a tributary of Deep Canyon, south and above the town of Palm Desert, at an elevation of 2500 ft., Santa Rosa Mtns., Riverside Co., California. This record represents the eastern-most locality and most arid environment for a salamander in California. The protected canyon has a continuous water seepage along the west facing cliff-like slopes that trickles above and below the limestone sheeting. The Batrachoseps seek shelter beneath the limestone during the hot dry months and migrate out to the canyon floor in the wetter winter months. Due to the less than an acre size of the locality and its uniqueness, it is urged that this Batrachoseps be placed on the rare and endangered list. The distinguishing characters of the Desert Slender Salamander are low numbers of trunk vertebrae (19-20); very large heads; long legs; large feet; reduced phalangeal formula of 0-2-3-2 for both hands and feet; and distinctive blackish maroon ground color spotted with silver and brassy iridophores dorsally and venter of tail flesh colored. The Desert Slender Salamander is one of the relict primitive forms in the genus. Its closest relative is Batrachoseps stebbinsi, the Tehachapi Slender Salamander.

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BRANDON, RONALD A. (So. Illinois U.). Hybridization experiments involving Ambystoma dumerilii.

Reproductive compatibility between Ambystoma dumerilii, the Lake Patzcuaro achoque, and other species of ambystomatid salamanders is being tested under laboratory conditions. These data, and others related to reproduction, add to the understanding of relationships among Mexican ambystomatids.

Some results obtained thus far are: (1) There is a high potential for interbreeding between A. dumerilii and A. mexicanum, the Xochimilco axolotl; reciprocal crosses through both artificial insemination and spontaneous interspecific courtship yield offspring with no increase in embryonic deformity or larval mortality. (2) No reduction in embryonic or larval viability occurs in crosses between A. dumerilii and Michoacan A. amblycephalum (?) and Illinois A. tigrinum. (3) Some embryonic deformity and prehatching mortality appear in crosses between A. dumerilii and South Carolina A. talpoideum. (4) A small number of hybrid A. dumerilii female x Rhyacosiredon rivularis male developed normally. Larvae from all crosses are being raised for eventual tests of interhybrid and backcross fertility.

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BRODIE, EDMUND D. JR. (Clemson U.). Two more toxic salamanders: Ambystoma maculatum and Cryptobranchus alleganiensis.

Injections of skin secretion from Ambystoma maculatum and Cryptobranchus alleganiensis into white mice proved lethal. Secretion was collected from enlarged glands concentrated along the tail ridge and parotoid region of A. maculatum; gland distribution is like that found in A. gracile and A. rosaceum. Defense posturing places these regions in proximity to the stimulus. The secretion of A. maculatum causes a drying, burning sensation to the tongue.

The skin secretion from C. alleganiensis was collected generally from the dorsal surface. This secretion is very bitter and causes a drying sensation to the tongue but does not burn.

Although lethal when injected, skin of these two salamanders was not toxic when injested by white mice and chickens. Skin secretions are nevertheless probably effective in repelling would-be predators.

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BUSSJAEGER, LOUIS J. (U. Oklahoma). Display behavior of Sceloporus horridus.

Display-action patterns were determined for the three subspecies of S. horridus from 287 filmed displays performed by 34 individuals from 10 localities. Subspecific and geographic variations were apparent in their displays. Most unique was that three different display-action patterns were fixed in the species, two in each subspecies. Many individuals performed either pattern at random. This is the first report of significant pattern variations fixed within the display of individual lizards as well as the species.

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DAVIS, JOHN D. (Miss. State U. for Women) and CRAWFORD G. JACKSON, JR. (San Diego State College). The comparative courtship behavior of Chrysemys concinna suwanniensis and Chrysemys scripta elegans.

The courtship displays of the Suwannee cooter, Chrysemys concinna suwanniensis and the red-eared turtle, Chrysemys scripta elegans were analyzed by high-speed videotape and photographic procedures. Fixed action patterns involving the forelimbs and foreclaws of the male were identified and described. Detailed examination and analysis reveals that a complex and highly stereotyped courtship display exists in the two species. Distinct male postures were described and analyzed quantitatively. It is suggested that the complex motor patterns involving the sexually dimorphic foreclaws of the males may have evolved from signal functions transferred from the jaws to the forelimbs. The biosystematics of the genus Chrysemys suggest that such studies may be of value in understanding taxonomic affinities and micro-evolution within this group.

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DELSON, JEFF and WALTER G. WHITFORD (New Mexico State U.). Physiological comparisons of desert and montane populations of Ambystoma tigrinum.

Studies on the comparative ecology of montane and desert populations of Ambystoma tigrinum over the past three years in Southern New Mexico demonstrated marked differences in microhabit utilization and life history suggesting possible physiological adjustments in these populations. Field observations on a desert population under conditions of pond drying suggested that these animals might have higher thermal tolerance and dessication limits than montane environments.

Measurements of the critical thermal maxima (CTM) of these populations showed that large neotenic forms from the desert had a significantly higher CTM than those from the mountains while the reverse was found in larva of smaller size. Desert neotenic and larval forms had significantly higher CTM than did transformed individuals of the same size class. There was no significant difference in vital limits of dessication between small and large transformed adults. However, a signiticant difference in per cent weight loss was noted between animals dessicated in the laboratory and those dessicated under "natural" conditions.

Preliminary studies on the body chemistry of adults after one month in a terrestrial environment showed a significantly higher concentration of serum milliosmolytes and serum urea.

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DIXON, JAMES R. (Texas A & M U.). Natural hybridization between Bachia intermedia and Bachia barbouri (Sauria: Teiidae).

Abstract not received.

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DOWLING, HERNDON G. (Amer. Mus. Nat. Hist.). Comments on boid (Serpentes) relationships.

Several lines of approach in recent years have suggested that the division of the Family Boidae into "pythons" and "boas" is overly simplistic. Robert Hoffstetter (1946) was among the first to point this out, and he was followed by L. D. Brongersma (1951), A. S. Romer (1956), Garth Underwood (1967), and others.

Most of the information offered to date has served to split off one or a few genera into smaller groupings, but none has been well defined. Recent information on chromosome type and hemipenis morphology give additional information on relationships.

A large group of boids, including both "pythons" and "boas" proves to have a characteristic karyotype. However, Corallus on one hand and Eryx on another have distinctive chromosome patterns. The relationships suggested by hemipenis morphology also cuts across the "boa-python" border. A completely redrawn pattern of boid relationships may ensue from this new information.

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ECHELLE, ANTHONY A., ALICE F. ECHELLE (U. Oklahoma) and HENRY S. FITCH (U. Kansas). Aggressive behavior among Costa Rican anoline lizards.

The aggressive displays of six species of Costa Rican Anolis will be described. Sympatric pairs of species were distinctly different in both of two important components of anole display: (1) the display-action-pattern, and (2) the nature of the dewlap. The dewlaps of sympatric species differed in all of three characteristics -- color, size, and shape. Regression analysis of dewlap area versus body-size appears to be useful in studies of the interrelationships between ecological factors and the nature of the display.

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ECHTERNACHT, ARTHUR C. (Boston U.). Geographic variation of Ameiva undulata (Sauria: Teiidae).

Geographic variation among 45 samples drawn from throughout the range of Ameiva undulata in Mexico and Central America was studied utilizing a modification of Gabriel's Sums of Squares Simultaneous Test Procedure (SS-STP). Approximately 25 characters of scutellation, color and pattern were examined. Clines are numerous and most of them parallel the essentially linear form of Middle America. There appears to be a "Tehuantepec X" similar to the "Panamanian X" of Dunn in that clines for various characters cross the isthmus in both directions. Ameiva undulata tnomasi Smith and Laufe is synonymized with A. chaitzami Stuart, and the placement of A. festiva miadis Barbour and Loveridge in the synonymy of A. undulata is supported.

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EDWARDS, STEPHEN R. (U. Kansas). Analysis of discontinuous variation in the Central American snake Scolecophis atrocinctus (Colubridae).

Specimens of Scolecophis atrocinctus were examined for variation in a number of characters. Basic statistics were calculated followed by univariate and multivariate statistical analyses to establish levels of significance in highly variable characters. It was determined that two distinct phena were contained in the species.

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ESTES, RICHARD (Boston U.) and OSVALDO A. REIG (U. Central Venezuela). The Fossil Record of Frogs: A Review of the Evidence.

The fossil record of frogs is limited. Although some very significant finds have been made, few Triassic and Jurassic deposits are known of the type likely to contain frog fossils. Wide-spread aridity indicated in Triassic sediments and the paucity of Jurassic continental deposits probably will always combine to make recovery of extensive frog fossils unlikely. Since presently known Jurassic frogs are in great part rather closely related to modern forms, late Paleozoic and Triassic fossils are especially needed to clarify the early evolution of the group.

Current work in frog phylogeny has made little use of the existing fossil record. Since interpretation of several Mesozoic frog fossils has been subject to differences of opinion, the usefulness of this paper has been felt to lie in resolving some of these differences and in evaluating some of the character-states found in the most important forms.

The following are the major problems that will be dealt with in the symposium paper. Space limitation prevents discussion of these problems here.

1. Doleserpeton and lissamphibian ancestry
2. Triadobatrachus as a frog ancestor
3. Vieraella, the earliest known frog (early Jurassic) and its relationships
4. Notobatrachus and its position in frog evolution
5. The Paleobatrachidae and their fossil record
6. Major diversification of frog families
7. Problems in the study of fossil frogs

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GUTTMAN, SHELDON I. (Miami U. Ohio). Biochemical Techniques and Problems in Anuran Evolution.

In recent years, systematic evaluation of groups of organisms has been facilitated by the use of non-morphological techniques. One of the newest of these techniques, biochemical analysis, has been of great value in corroborating, and in some cases, modifying, phylogenies of Drosophila, coleopterans, primates and certain plants.

Few biochemical studies of anurans have been made. These analyses have determined patterns of integumental pteridines, parotoid gland secretions, general skin venoms, blood proteins and organ homogenates. Chromatographic, electrophoretic and serological techniques have been employed. Results of these studies indicate individual variation, polymorphism, interpopulation variation, species specificity and some higher order relationships. The absence of a trend in any biochemical system examined is evident; this may be due to investigations being few in number, non-uniform techniques being utilized and/or a lack of concentrated effort by biochemical systematists to supplement findings based on other non-morphological and morphological methods.

Future biochemical work, if properly oriented, can be of great value in determining anuran phylogeny. Sophisticated quantitative procedures, such as microcomplement fixation, are presently available to evolutionists for use in clarifying difficult problems of relationship at all anuran taxonomic levels.

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LYNCH, JOHN D. (U. Nebraska). The Transition from Archaic to Advanced Frogs.

Early classifications of the anurans sought to cite the distinctions between living groups rather than to point out their similarities. In any classification both qualities are needed in order to have a realistic classification. The arrangements proposed by Cope, Boulenger, Noble, Orton, Hecht, Griffiths, Inger, and Kluge and Farris suffer from the small number of characters employed and with the exceptions of the last few, suffer from stressing one or two characters as "more fundamental" for interpreting phylogeny.

The characters employed and their weighting are the basis of any classification. The one proposed here employs 34 equally weighted characters, 22 of which are osteological, five myological, three larval, and four additional non-osteological. Primitive character-states are scored 0, derived states 2. Scoring each character equally, the sums for each of approximately 40 family groups may be compared: low values reflect the retention of more primitive character-states whereas high values reflect the retention of few primitive character-states and the acquisition of more derived (advanced) states.

Three levels of organization are apparent: (1) Ascaphidae and Discoglossidae, (2) Pelobatidae, Pelodytidae, Cycloraninae, and Heleophryninae, and (3) all other frogs including pipids and some leptodactylids at the base and the microhylid groups at the apex. This arrangement is an evolutionary grade and fails to account for cladistics. It does point out that pipids and rhinophrynids are not appropriately included in the "archaic frogs." Characterizing archaic and advanced frogs is difficult when many characters are employed because it ignores the transitory groups (Pelobatidae and Old World leptodactylids) and the division attempts to include pipids and rhinophrynids as archaic frogs. If we insist on formal recognition of Archaic and Advanced frogs, the only Archaic frogs are the Ascaphidae and Discoglossidae.

A small group like the Anura is unduly burdened by suborders. I propose that supratamilial groups be denoted by superfamilies. Thus the Ascaphoidea includes Ascaphidae and Discoglossidae, the Pelobatoidea includes Myobatrachidae (Old World "leptodactylids"), Pelobatidae, Pelodytidae, Rhinophrynidae, and Sooglossidae, the Pipoidea includes Pipidae, the Bufonoidea includes Bufonidae, Centrolenidae, Dendrobatidae, Hylidae, Leptodactylidae, Pseudidae, and Rhinodermatidae, and the Ranoidea includes Microhylidae and Ranidae (tentatively including Hyperoliidae and Rhacophoridae).

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MERRELL, DAVID J. (U. Minn.). Ecological Genetics with Anura.

Ecological genetics stems from the union of population genetics and population ecology. It is the study of the ways in which natural populations are adapted to their physical and biological environments, and the mechanisms by which populations respond to environmental change.

The burnsi and kandiyohi polymorphisms in the leopard frog, Rana pipiens, were chosen in order to study some of the theoretical and mathematical concepts of population genetics and population ecology in natural populations. Both field and laboratory studies were conducted.

The results of these studies gave a clearer picture of the distribution and frequency of these dominant genes in the Upper Midwest. Heterosis has been shown to be an unlikely explanation for the polymorphisms. Instead the burnsi type appears to survive the winter somewhat better than the wild type pipiens, and kandiyohi, which seems confined to the prairies, seems to metamorphose earlier than pipiens, an adaptive advantage where breeding ponds tend to dry up prematurely.

Other studies have demonstrated natural selection against a deformity, and have permitted a comparison between population size based on mark-recapture data and Wright's "effective size" of the breeding population based on egg mass counts.

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MILSTEAD, WILLIAM W. (U. Mo.-Kansas City). Toward a quantification of the ecological niche.

The suggestion is made that a finite number of broad ecological niches exist in any biome type, and that these niches may be defined by comparisons of ecological equivalents from different continents. Biological points of comparison should include ecology and physiology as well as morphology.

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MINTON, SHERMAN A. JR. and SYLVIA KENDALL SALANITRO (Ind. U. Med. Cntr.). Further Studies on Serological Relationships among Colubrid Snakes.

Sera of 22 species of colubrid snakes were studied by immunoelectrophoresis using antisera against Coluber constrictor, Elaphe vulpina, Natrix sipedon, Naja naja and Crotalus horridus to develop the preparations. Development of a snake serum with its homologous antiserum gives a pattern of seven or eight precipitin arcs. Some of these represent components widely shared among snakes while others are more or less specific for closely related taxa.

Two serological groups can be distinguished in our material. One consists of Elaphe (3 sp.), Lampropeltis (2 sp.) and Pituophis melanoleucus. The other consists of Natrix (4 sp.), Thamnophis (2 sp.), and Regina septemvittata. Serologically these groups are as distinct

from each other as they are from Naja and Crotalus. Coluber constrictor is somewhat intermediate between the two but closer to Elaphe. Four Old World colubrids, Coluber jugularis, C. ravergieri, Spalerosophis diadema and Malpolon monspessulanus, are serologically intermediate between Coluber constrictor and Elaphe. Psammophis schokari, Trimorphodon biscutatus, Leptodeira maculata, and Heterodon platyrhinos do not fit either of the above groups nor do they appear to be closely related to one another.

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PURDUE, JAMES R. (U. Oklahoma). A comparative study of the body movements of displaying males of the lizard genus Sceloporus (Iguanidae).

Males of the species of the genus Sceloporus display by performing a series of push-ups involving their forelegs and, to varying degrees, their hindlegs. The amount of shoulder and hip movement per push-up was quantified by calculating two ratios: one by dividing the vertical shoulder movement by the vertical eye movement, and the second by dividing the vertical hip movement by the vertical eye movement. Each of the 21 species analyzed had a characteristic mean hip ratio. Interspecifically there was a highly significant positive correlation coefficient between the mean shoulder and hip ratios. Species that had much hip movement also had much shoulder movement.

Another significant, but negative, correlation was between the mean hip ratios and the mean snout-vent lengths. This relationship was attributed to a general compensation for the proportionately greater weight of the larger species. Further analysis indicated that the amount of hip movement was not merely an individual response to the weight/length relationship. Rather it was a genetic response by the species with closely related species having similar amounts of hip movement.

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RABB, GEORGE B. (Chicago Zool. Park). Evolution of Mating Behavior.

Abstract not received.

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SALTHE, S. N. (Bklyn. Coll. C.U.N.Y) and WILLIAM E. DUELLMAN (U. Kansas). Evolution of Reproductive Adaptations.

Salthe found close relationships between ovum size, body size, and clutch size in urodeles. Anurans have a much more complex spectrum of life histories so that it is of interest to see whether these relationships obtain with them as well.

Ovum size correlates positively with female body size, but not in a simple way for all frogs. The correlation is clearly apparent only within single modes of reproduction (composite of site of development and mode of development). Even then the correlation is not perfect because clutch size varies to some extent independently, so that the correlation is best with total clutch volume. Thus, many Rana and Bufo have essentially the same modes of reproduction, but Rana ova are generally larger than those of Bufo within a given adult size class while the clutch sizes of Bufo tend to be larger. Within any size range of female body size ovum size and clutch size are inversely correlated. Clutch size also correlates with female body size, but again this is most clearly apparent within a single reproductive mode.

One can approach ovum size also from the ecological point of view, emphasizing the site of development instead of female body size. There is evidently some necessity for having larger eggs in stream situations or in terrestrial nests and smaller ones in association with standing water. In the latter case we may be seeing the results of selection for larger clutch sizes (increased genetic variability per reproduction). In streams and terrestrial situations, however, larger tadpole or hatchling size becomes important. Size at hatching can only be increased by increasing ovum size. We can also combine site of development, ovum size, and female body size in one correlation. Again, ovum size increases with female body size but clearly so only within a given site of development. Within a species there is much data showing increased clutch size with increased female body size, but very little indicating an increase in ovum size with female body size.

Although within a species larger ova tend to respire at higher rates than smaller ones, an increase in ovum size phylogenetically is associated with lowered developmental rates, and so a change in ovum size, say in connection with stream adaptations, exacts a price in slower development, which might in turn make necessary less accessible nesting sites, such as the branches of overhanging trees.

Increased ovum size, of course, cuts fecundity for any given reproduction. In the tropics or subtropics, where this has frequently occurred, there is another aspect of the life history strategy that can be varied to compensate for this - the number of times a female will breed in a year. Ovum size could perhaps only be increased in some cases if it were possible also to increase the number of different times a female ovulated in one year.

In short, all aspects of reproductive strategies are interconnected to produce a single whole. One parameter, such as ovum size, is for this reason found to correlate with all other parameters. This interconnectedness must also impose limits on change or reproductive mode in that all aspects must change together simultaneously.

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SAVAGE, JAY M. (U. So. Calif.). The Geographic Distribution of Frogs: Patterns and Predictions.

The present distribution of 43 families and subfamilies of frogs falls into five major patterns: a) northern extratropical; 4 groups b) cosmopolitan tropical; 2 groups, c) wide-spread tropical; 3 groups, d) tropical; 27 groups, and e) southern extratropical; 6 groups. The groups contribute in various degrees to form 5 major world frog faunas; the Holarctic, the African, the Malagasian, the Australasian and the South American. The Indo-Malayan region forms a transitional area between Holarctic and Australasian frog faunas. When these patterns are correlated with known aspects of evolutionary relations, the fossil record and paleoclimatic associations, it is evident that three major frog lineages were present by earliest Jurassic and the fourth by the end of that period, that most families of frogs were present by mid-Cretaceous, that present distribution patterns are Cenozoic modifications of those established in Mesozoic and that the patterns are best explained in terms of the concepts of continental drift and the history of the two super continents of Mesozoic, Laurasia and Gondwanaland.

Five major historical source units are recognizable on the basis of these data:

OLD TROPICAL - derivatives of groups distributed in tropical regions of Laurasia and Gondwanaland by early Jurassic, disjunct circumtropical distribution today (e.g. caecilians, pipids and microhylids).

LAURASIAN - derivatives of stocks established in Laurasia by Jurassic and associated with Eurasia and North American throughout history; circumpolar during much of Tertiary but fragmented by cooling and drying trends in late Cenozoic (e.g. salamanders, ascaphids, discoglossids and pelobatids).

ANTIBOREAL - a group of frogs (Leiopelmatidae) known from Jurassic onward in extreme southern Gondwanaland and its fragments.

YOUNG TROPICAL - derivatives of groups that evolved in tropical areas of the western Gondwanaland continent by early Cretaceous; in Cenozoic developing extensive tropical radiations and expanding onto Eurasia and North American (e.g. bufonids and ranoids).

SOUTH GONDWANIAN - descendents of a southern extratropical group that became fragmented by continental drift onto several land masses derived from Gonwanaland; in Cenozoic radiating northward into tropical America and Australasia (e.g. leptodactyloids, hylids, nyctimystids, dentrobatids).

The fundamental pattern of amphibian distribution is derived from two primary sources: 1) the ancient establishment, by early Jurassic, of two major centers of evolution, one on the northern Laurasian land mass (salamanders, some xenoanurans, lemmanurans and pelobatids) and another on the southern Gondwanaland supercontinent (caecilians, pipids, microhylids and advanced acosmanurans); 2) the fragmentation and evolution in isolation during Cretaceous of caecilians and frogs on the six land areas derived from Gondwanaland and of salamanders and northern frogs on Laurasia. Contrary to the ideas of Darlington (1957: 158) frog evolution has not been centered on the Old World tropics. Substantial distinctive radiations of microhylids and acosmanurans have taken place in each tropical area, except on the Indian Island where caecilians and microhylids developed in a unique fashion. In Africa the radiations involved caecilians, microhylids, bufonids and ranoids; in Australasia microhylids, myobatrachids and nyctimystids; and in South America microhylids, bufonids, hylids and leptodactylids. The basic stocks for the radiations of leptodactyloids and their derivatives in Australasia and South America were

temperate adapted groups that invaded subtropic and tropical regions from the south. The tropical areas of India and south-east Asia have never been a major source region for frog evolution and radiation, but serve as a refuge for tropical Asian groups displaced southward by cooling late Cenozoic trends and the ancient Indian caecilian and microhylid stocks that developed while the sub continent was a Cretaceous and early Tertiary island. In Cenozoic, the connections established between several southern land masses and northern regions allowed invasion of North America and Eurasia by southern tropical lines. The most successful radiations were by bufonids and hylids from South America and by ranids from Africa.

These groups have followed the northern land masses as immigration routes, the former two families into Eurasia from North America, and the latter to North America from Eurasia. Bufonids subsequently have moved southward from northern Asia into India and Indo-Malaya and ranids have now reached South America. Remnants of the ancient fauna of Laurasia still persist in Eurasia (salamanders, discoglossids and pelobatids) and North America (salamanders, Ascaphids and Rhinophrynids). The peculiar endemic genus Leiopelma of New Zealand is a relict of an ancient temperate Gondwanaland radiation. The most consistent theme of amphibian evolution is the unique quality of radiations on each Gondwanaland derivative land mass; the role of pre-emptive occupancy of ecologic (adaptive) zones as limiting their composition, rather than competitive replacement; and growth and increasing diversity through addition of new groups that coexist with earlier stocks.

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SAVITZKY, ALAN H. and HOBART M. SMITH (U. Colorado). Concerning the taeniata group of the genus Tantilla (Serpentes: Colubridae).

Three additional members of the taeniata group of the colubrid snake genus Tantilla are recognized. T. cuniculator, from the Yucatan Peninsula is referred to the taeniata group; it may also bear evidence concerning the identity of T. trilineata. T. cuniculator and a new species from the Atlantic versant of Oaxaca represent the only known bilineate members of the otherwise trilineate taeniata group. The bilineate species from Oaxaca, known from a single specimen, is further characterized by the retention of only remnants of the lateral light stripes and by an extremely high ventral count. It appears to be most closely related to T. taeniata. A new trilineate species, also from the Atlantic versant of Oaxaca and represented by a single specimen, differs from other members of the taeniata group in having a narrower dark field ventral to the lateral light stripe. It, too, appears to be most closely related to T. taeniata. A general trend toward loss or obscuring of the light stripes is evident in the taeniata group, and has occurred polyphyletically. Evolutionary and distributional patterns within the taeniata group present problems of interpretation.

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SCHIOTZ, ARNE (Danmarks Akvarium). Evolution and Mating Call: Ecological Considerations.

Until recently evidence for the function of the mating call in Anura has been incomplete and sometimes contradictory, as stated by Bogert 1960. A number of observations in later years have shown definitely, however, that in many species an important role of the mating call is that the female during part of the reproductive cycle is positively attracted to a calling male of its own species. This does not seem to be the case during the migrating period, or the pre-spawning period, present in some species, but only in the beginning of the spawning period. Observations have also shown that females seem indifferent to voices of other, even closely related species, so it is undoubtedly correct to conclude that the mating call plays an important role as an isolating mechanism in the Anura. Observations (Brattstrom) seem to show that there is also an element of competition between males, the dominant male in the chorus structure having the largest chance of reproducing. Finally, the mating call possibly also has a territorial function.

Experiments or reliable observations showing that the mating call plays other roles, for instance in forming breeding aggregations, seem to be lacking.

It is thus to be expected that the function of the mating call as an isolating mechanism will tend to keep it as stable as possible within a taxon, while the competition between males will encourage an evolution of the call within the taxon.

In accordance with their role as isolating mechanisms, the mating calls of sympatric species seem always to be distinct from each other. Examples of character displacement in voices has been recorded (Blair, Littlejohn).

Generally speaking the voices of species within a genus are similar - a rule with many exceptions. Genera within a family, however, do not seem to have similarities in voice not shared with genera from other families.

On the intraspecific level - subspecies within a species and species within a superspecies - the difference between voices is very small, often, but not always, smaller than the morphological differences in the three sets of characters; habitat preference, voice, and morphology in a number of polytypic species within the African genera Leptopelis and Hyperolius. Apparently habitat preference is the most stable character with a number of closely related forms, voice less constant and morphology and colour pattern even less. If we thus, for a systematical group, attempt to base a zoogeography on morphology and compare it with one based on voices, we will see that the zoogeography based on morphology gives the finest subdivisions; there is perhaps a tendency that the more recent geographical barriers are shown only in morphology, the older in morphology and voice. Other groups (e.g. Crinia in Australia) will show a different pattern.

Apart from the strong tendency for voices within a genus to be similar, there is perhaps another, much weaker, tendency for the voices in similar habitats to be similar. This is a very doubtful trend, but it seems to be the case for the African frogs breeding in temporary pools in dense forest. A majority of these have a characteristic, quiet voice. Also the voices of a number of species which do not form breeding aggregations seem to have common characters, being high pitched, insect-like screams, which have perhaps developed as a result of the difficulties encountered in tracing these voices.

A number of mute forms are found in widely different systematical groups. Generally they do not seem to occur sympatrically with closely related forms, and therefore do not need the voice as isolating mechanism.

An attempt to get an impression of the evolution of the mating call by comparing mating calls within the different systematical groups of Anura does not give much result. The primitive Leiopelmidae have no vocal sac and no voice, and the primitive Pipidae lack a vocal sac but have a primitive mating call. In both cases it seems doubtful whether we have a true primitive character or rather an adaptation to the mode of life in these families. The remaining Anuran families seem all to have highly developed voices.

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STARRETT, PRISCILLA H. (U. So. Calif.). Evolutionary Patterns in Larval Morphology.

The importance of larval characters in determining anuran phylogeny is the subject of much controversy. I believe this controversy has resulted from interpreting external characters without adequate knowledge of the internal morphology. The position of the spiracular openings in anuran tadpoles has increased significance when related to the structure of the branchial chambers and the position of the forelimbs. Comparative embryological studies show that all larvae have bilateral openings at some stage in their development. The operculum grows posteriorly and medially at different rates to produce the final distinctive types. This is evidence of the primitive nature of bilateral spiracular openings. The chondrocranium, jaw cartilages and jaw musculature also show differences in major groups of anurans.

The first group, Xenoanura, is characterized by two separate branchial chambers with two external openings and the forelimbs developing posterior to the chambers. The jaw cartilates are simple with no separate infralabial cartilages. Feeding and respiration involve essentially the same actions and utilize the same mandibular and hyoid muscles.

In the second group, Scoptanura, two separate branchial chambers, having two internal apertures are connected to the exterior by a single opercular tube opening ventrally. The forelimbs develop posterior to the gill chambers, also. Respiration and feeding are similar, but a small separate infralabial cartilage along with a unique mandibular muscle enables these tadpoles to feed on infusoria by means of a protrusible lower jaw. These two groups feed on microorganisms and many species are efficient filter feeders.

The other two groups of tadpoles are characterized by the development of a long coiled gut necessary for algae digestion. Related to this is the development of an upper jaw cartilage and modification of the lower jaw cartilages producing an extra joint and a more flexible functional

mouth. Modification of the mandibular and hyoid musculature accompany this feeding specialization. The branchial area is reduced and appears to have been "pushed" anteriorly by the much larger gut. A single median spiracle or a sinistral spiracle are two different ways of increasing the efficiency of the respiratory and filtering surface of the gills. The Lemmanura have separate branchial chambers opening with a single mid-ventral spiracle. The forelimbs develop very close to the posterior peribranchial ectoderm. The Acosmanura have the original two branchial chambers connected by a ventral communicating channel producing a functional single chamber. This usually has a sinistral opening. In this group the forelegs develop within the branchial chamber.

The position of the spiracle is related to hydrodynamic balance. It is a decided advantage to a mid-water feeder to have either bilateral spiracles or a single ventral opening as the excurrent flow of water exerts a force which affects the positioning of the tadpole. In addition, the shape of the tail fin and presence of a terminal filament are important factors in maintaining a desirable feeding position. A sinistral spiracle is more advantageous in bottom feeding as the excurrent siphon is not obstructed.

The development of accessory mouth structures: shearing beaks, denticles and papillae have enabled the tadpoles of acosmanuran frogs to occupy a myriad of niches. The adaptations are usually related to specific habits and any generalizations should be made with caution. For example, expanded lips can produce an adhesive mouth structure enabling tadpoles to live in fast moving water. However, rheophilous tadpoles occur with abdominal adhesive discs or without any modifications for clinging. Large lips are also used for surface feeding and for sweeping in food. Increased numbers of denticle rows occur in some forms with adhesive mouths but also may be used for grasping prey by carnivorous animals. Other tadpoles have greatly reduced lips. The numerous specializations allow many aquatic habitats to be utilized.

In contrast, the more primitive tadpole of the scoptanuran frogs is successful primarily in the tropics and has developed very few major variations in structure. Various types of non-aquatic development occur in many families of frogs. In the microhylids this has been an especially important factor in overcoming the limitations of the tadpole.

Although there is considerable variation in some of the superficial characters, the basic internal morphology of the tadpole remains much more constant.

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STRAUGHN, IAN (U. Coll. Townsville). Evolution of Mating Calls: Bioacoustical Considerations.

Studies of anuran mating calls have played a significant role in understanding systematics and evolution within the order, particularly in defining species and their inter-relationships. Except for the most primitive members of the order, voiceless frogs have arisen secondarily. Indeed, the extant primitive species could also be remnants of voiceless derivatives of the earliest frogs which for the most part were vocal but have been replaced by more advanced forms. The phylogentic origin of mating calls is so old it cannot be established with any certainty, but it would seem that vocal communications of some form have been present since the origin of the group.

Within the order there has been considerable divergence of call characters and the behavioral function of the acoustic communication systems. Electronic analysis and precise description of mating calls have greatly enhanced their use as taxonomic tools. However, their use above the species group, or, at most, generic level has been suspect. Looking at so called "mating calls" in the context of communication systems rather than just describing the calls per se may provide information that is more useful in examining higher taxonomic categories.

By defining these communication systems, categorizing them as primitive, advanced or derived on the basis of communication theory (independently of established phylogeny), a new insight into higher taxa and their relationships may be gained. So little information is presently available on the functionality of anuran communicative systems that such an analysis must be largely speculative. However, by using the information available from the small sample within each family on which there are data, inter-familial relationships can be postulated.

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TAYLOR, DOUGLAS H. (U. Notre Dame). Effect of cyclic injections of melatonin on the biological clock of larval Ambystoma tigrinum.

Research in birds and mammals has implicated the pineal system in the control of biological clocks and testicular recrudescence. Although the mechanism of stimulation may differ, control seems to be exerted through the cyclic production of melatonin (5-methoxy-N-acetyltryptamine) which is synthesized from the O-methylation of N-acetylserotonin by acetylserotonin methyltransferase in response to light.

Preliminary evidence from studies of Ambystoma tigrinum larvae, kept in constant light and in constant dark, supports the hypothesis that a similar system is operative in these amphibians. Daily injections of melatonin, administered at 1200 each day for 3 days via a flow-through system, can serve to rephase the biological clock of these animals and to shift their expected orientation direction by approximately 90 degrees. This suggests that melatonin may be the chemical transducer for biological clock control.

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TAYLOR, EDWARD H. (U. Kansas). Squamation in caecilians.

The primary purpose of materials impervious to liquids, at or near the surface of the body surface of organisms, is usually for control of moisture acquisition or loss. The material may be bone, scales, or modified skin; the control may be by means of slime secretions that make the surface wholly or partially impervious.

Caecilians originally may have depended chiefly on materials now covered by skin, which are designated scales or squamae. The number of rows around the body may exceed a thousand. The greatest coverage is on species that are regarded as the most primitive. In certain forms, perhaps more recently evolved, the scales may be reduced to one or two rows near the terminus of the body, or they may have altogether disappeared. The trend of loss is from fore to aft. Certain families are wholly without scales; in one scales are present in all forms; and in still another the scales are present in some forms, absent in others.

The question as to whether the character of the scales differ sufficiently to be used as a taxonomic aid is considered, with the conclusion that while not wholly practical they may so serve.

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TRUEB, LINDA (U. Kansas). Bones, Frogs, and Evolution: A Phylogenetic Dilemma.

Commencing with Cope and Boulenger in the nineteenth century, osteological features became pivotal characters in the classification of anurans. The classification has been revamped repeatedly and modern methods utilizing statistical techniques and computer technology allow the researcher to interject more and more characters in ever increasing detail into programs designed to diagnose evolutionary relationships. Nonetheless, the osteological criteria employed have been refined only slightly in the intervening 100 years. This is in a large part due to the lack of interest expressed in descriptive morphology during the past three decades. Generic monographs and species descriptions have tended to stress obvious, external traits and slight osteological characters. This is unfortunate because often the skeleton is a source of many distinctive features at the generic and specific levels. There is considerable information available on some of the more distinctive groups such as the ascaphids, discoglossids, and pipids, and of course, Rana. However, for the majority of anurans, osteological information is scanty and highly divergent with respect to its quality and thoroughness; such circumstances discourage attempts to synthesize information and clearly indicate the need for basic osteological investigations at the family, generic, and specific levels.

Proper evaluation of osteological characters and their evolutionary significance is contingent upon an understanding of the nature of the tissue involved and its capacity for modification. Bone has classically been thought to arise from one of two sources, either from membranous connective tissue or cartilage; these two types are known as membrane or dermal bone, and endochondral or cartilage bone, respectively. Until relatively recently, it was conceeded that the two types were unrelated and characteristically gave rise to particular elements. Recent evidence strongly suggests that the two bone types are not independent, but instead represent extremes of a continuum which embraces a variety of bone formations derived from either one or both sources. There is good evidence to indicate that in the course of evolution centers of ossification are capable of migration to produce fusions of formerly discrete elements. Furthermore, it has been shown that new centers of ossification appear in response to need for additional bone. Heterochrony acts to arrest development of bone and produce apparent reversals

in the occurrence of primitive or paedomorphic characters in otherwise advanced anurans. In summary, osteological features are a great deal more labile and subject to considerably more variation than has been thought by previous workers.

A synthesis of the extant information on anuran osteology has suggested several generalized evolutionary trends. There is a trend towards reduced ossification and reduction of the number of component skeletal elements among modern anurans. Addition of dermal elements, marked expansion and modification of existing dermal elements, and synostosis of endochondrally and dermally derived elements, can usually be interpreted as specializations. Modifications of the first two types frequently concur with marked reduction elsewhere in the same architectural unit. There apparently is an upper limit to the amount of bone that can be involved in any given supportive system, although there is no evidence that the converse is true. The greatest reservoir of evolutionary change lies in the typical dermal components of the anuran skeleton system; endochondral elements, by comparison, are more conservative. Dermal elements, and to a lesser extent endochondral elements, are frequently subject to adaptive modifications; similar modifications may appear independently in several groups.

Several more specific evolutionary patterns have emerged from this study, as follow: The anuran cranium is characterized by consolidation of ossification centers and cranial nerve foramina, reduction in the width of the premaxillary, and repeated, independent loss of the quadratojugal, palatine, and prevomer. Addition of bone externally is countered by reduction of bone internally. The function of the pterygoid has tended to shift from that of a palatal bone to that of a suspensory element. The evolutionary sequence of dermal modification follows an obligate pattern which commences with exotosis and may progress to casquing and terminate with co-ossification. The hyoid tends to remain cartilaginous and have smaller, less elaborate ancillary processes. There is a notable trend towards development of firmisternal-like pectoral girdles; modification of the arciteral condition is usually accompanied by loss of the procoracoid, reduction of the clavicle, elaboration of the scapula and pre- and postzonal elements, and reduction in the length of the pectoral arch. The cervical cotyles tend to become laterally displaced, and transverse processes of the presacral vertebrae tend to become equivalent in width to one another and the sacral diapophyses. Primitively, the sacral diapophyses are broadly expanded; they tend to be reduced in length among advanced anurans. The pelvic apparatus shows a trend towards morphological elaboration whereas the appendages demonstrate fusion and loss of component elements.

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VIAL, JAMES L. and JAMES R. STEWART (U. Mo.-Kansas City). Comparative studies on activity patterns of Desmognathus quadramaculatus and Leurognathus marmorata.

Field studies in the southern Appalachian Mountains were correlated with those conducted in controlled environmental chambers. Both D. quadramaculatus and L. marmorata exhibited substantial daytime activity, although light may not be the initiating cue in the latter species. In constant darkness both species demonstrated a trend to arrhymicity from their normal activity cycles. Desmognathus frequently occupies deep burrows whereas Leurognathus does not; however, a relatively greater amount of foraging behavior is characteristic of the more aquatic Leurognathus. No temporal isolation was detected between specific activity patterns.

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WASSERSUG, RICHARD (U. Calif.). Ecological and Behavioral Patterns of Anuran Larvae.

Gregarious behavior patterns in anuran larvae have both ecological and evolutionary implications. Certain tadpoles form non-oriented social aggregations, showing mutual attraction - approach. In addition parallel orientation may be present at times (i.e., true schooling in the sense of Shaw, 1970).

Partitioned clear plastic trays were used to measure statistically the aggregating tendencies of various tadpoles. Xenopus laevis, Rhinophrynus dorsalis and Bufo boreas all exhibit a strong ($.99<p$) mutual approach response. Rana pipiens also exhibits this response ($.90<p$) but it is absent in Rana boylei, Hyla regilla, Scaphiopus hammondi and Ascaphus truei (at both 8° and 23°C).

Elements of schooling behavior are evident in the optomotor response of fish. Tadpoles, therefore, were tested in an optomotor apparatus similar to those used to study this phenomenon in fish. Xenopus laevis, Rhinophrynus dorsalis, Hyla regilla, Rana pipiens, R. catesbiana, R. boylei and Bufo boreas showed a significantly strong tendency to orient in the direction of the moving drum and to swim at the speed of drum rotation. Ascaphus truei did not (8° and 23°C).

The aggregating behavior of the tadpoles in the plastic trays is consistent with knowledge of their ecology. Tadpoles of Bufo boreas, Xenopus laevis, and Rhinophrynus dorsalis all form natural, dense aggregates. Stream forms, like Ascaphus truei and Rana boylei do not, perhaps because it is energetically difficult to maintain group integrity in a current. The optomotor response seems to be nearly ubiquitous in tadpoles. Its absence in Ascaphus truei may be a specialization correlated with the habit of substrate adhesion in dark, fast-flowing streams. Ascaphus tadpoles have well-developed lateral line systems and eyes positioned so as to preclude effective lateral vision. The specialized behavior of Ascaphus tadpoles does not support Schmalhausen's (1964) view of this tadpole as the generalized tadpole ancestral type.

Tadpoles that show true schooling mostly fit into two classes. Xenopus, certain hylids and microhylids typically form midwater schools. These tadpoles are often specialized filter-feeders with eyes far lateral, a rapidly beating tail filament, reduced pigmentation and a symmetrical spiricular pattern. Shallow water and bottom schools are more common. This pattern is typified by Bufo tadpoles which are not as efficient at filter feeding and tend to be dark colored with eyes dorso-lateral. They form closely packed, slow moving or stationary schools. There is some evidence that gregarious Bufo tadpoles are unpalatable to vertebrate predators. Examples of non-Bufo tadpoles that form conspicuous dark aggregations are Hyla maxima (presumably actually H. geographica; vide Kenny, J. S. 1969 The Amphibia of Trinidad.--Ed.) and Leptodactylus melanonotus.

It is well-known that growth is inhibited in crowded tadpoles. Although Licht (1967) claimed this inhibition to be nonspecific, his data may be interpreted to show that tadpoles likely to form dense schools also tend to show the least amount of inhibition.

Interspecific and interfamilial behavioral patterns that correlate with ecology and morphology in tadpoles suggest that tadpole behavior may be valuable in understanding the evolutionary biology of the Anura. The possibility of kin selection and mimicry complexes among conspicuous aggregating tadpoles are two of the more fascinating problems that will not be solved until there is more comparative ecological data available.

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WOOLLEY, H. PATRICK (E. Central Jr. Coll.). The ecology and distribution of Eurycea longicauda melanopleura and Eurycea lucifuga in western Missouri.

This study of E. lucifuga and E. longicauda melanopleura consisted of five parts: (1) distribution and ecology of the two salamanders in western Missouri, which is the western boundary of the known range, (2) establishment of reasons for their close association with limestone, and (3) caves, (4) reasons for segregation in many areas, particularly in caves, (5) development of a suitable method for marking salamanders other than the conventional "toe clipping."

A significant portion of this investigation pertained to interspecific competition. Both species were occupying similar niches in western Missouri. Interspecific competition probably causes them to segregate (87 of 105 caves in western Missouri which contained salamanders exhibited segregation). Utilizing Cole's (1949) "measurement of interspecific association" a negative .348 was derived indicating that interspecific competition is present. A Chi square value of ($P < 0.01$) indicates that this figure is statistically significant. In the eighteen caves which had integrated populations, interspecific competition for food occurred in the early spring when flooding within caves caused food to be dispersed more evenly throughout the cave. E. lucifuga were found to be more aggressive feeders than E. l. melanopleura in the laboratory. Approximately sixty per cent of the E. l. melanopleura salamanders methodically began dispersing themselves following flooding from areas of higher interspecies concentrations to areas on the perimeter where salamander concentrations were reduced.

The presumed reason for this dispersal of E. l. melanopleura salamanders is that they were existing in an area where competition was high and food densities were low. Following flooding, food was distributed more evenly, thus increasing food densities and reducing competition. As food was reduced within areas of the cave perimeter, E. l. melanopleura migrated to areas of higher food density and lesser competition outside the cave, followed by the progressive movement of E. lucifuga, which began to exhibit intraspecific competition.

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WORTHAM, EDWARD and MAX A. NICKERSON (Arkansas State U.). A serum protein study of Ozark Cryptobranchus.

This study was to determine if disc electrophoretic patterns of serum proteins could be used to distinguish between populations of Cryptobranchus from north and south draining Ozark streams.

The serum from ninety Cryptobranchus, thirty from each of three populations, was subjected to electrical migration through polyacrylamide gels, following closely the procedures of Davis (1961).

The serum protein patterns of C. bishopi from south draining streams and C. alleganiensis from north draining streams were distinguishable when the serum protein patterns between 13mm to 20 mm of the middle zone of the separation gel were analyzed with regard to their migration rate. It is suggested that Cryptobranchus from the north and south draining streams of the Ozark Plateau may have been separated since late Tertiary and currently should be treated as separate species.

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ROW 1 (seated, left to right): Kraig Adler, Tom Collins, James Vial, Robert Gordon, Ronald Brandon, George Zug, James Dixon, Richard Etheridge, Sherman Minton, Herndon Dowling, Priscilla Starrett, Bayard Green, William Milstead; (standing): Willy Becak. ROW 2 (standing): Jorge Jim, James Bogart, John Applegarth, Otto Sokol; (seated): Mary Rabb, Robert Inger, Jay Savage, Arne Schiotz, William Duellman, Stanley Salthe, Linda Treub, Ian Straughn, Frank Blair, Sheldon Guttman, Richard Wassersug, Osvaldo Reig; (standing): John Lynch, Roy McDiarmid, Harry Gregory. ROW 3: Alan Leviton, Alan Savitsky, Lynne Kour, Itzchak Gilboa, Craig Nelson, Paula Degenhardt, William Degenhardt, David Cundalle, James Stewart, Arthur Dunham, Robert Beatson, Don Smith, Laurence Hardy, Diane Secoy, Sharon Emerson, John Wright. ROW 4: Robert Drewes, Paul Cupp, Madge Minton, Arden Brame, Joseph Kennedy, Patricia Pisani, Dorothy Brueckner, Martha Crump, Robin Andrews, David Dennis, Bonnie Dennis, Jan Caldwell, Paul Robertson, Ray Ashton, Marilyn Ashton, Kirk Jones, Dean Metter. ROW 5: A. Clark, Ronnie Howard, Bob Fleet, Konrad Bachmann, Abraham Goldgewicht, George Pisani, James Christiansen, Edmund Brodie, Bruce Means, Fenton Kay, Henri Seibert, David Sever, Pat Callahan, Ronald Cromble, James Delahoussaye, Cesar Radns, Ralph Axtell. ROW 6: Ronald Heyer, Gerald Regan, Martin Fouquette, Jeffrey Black, James Purdue, Charles Carpenter, Louis Bussjaeger, Roy Smith, George Drewry, Reinaldo Diaz, Fabio Heredia, Juan Rivero, Donald Clark, Haydee Solano de Chacin, Delia Rada, Richard Worthington, Peter Mundel, Wayne Morris, David Merrell. ROW 7: Dolores Adler, Daniel Watson, Max Nickerson, Ronald Altig, Douglas Taylor, Edward Wortham, Douglas Reagan, Charles Mays, C. J. Zenisek, Robert Werth, Thomas Coss, Gary Myers, Thomas Fritts, Arthur Echternacht, George Rabb, Richard Estes.

Persons registered but not in photo: L. K. Beatson, Thomas Berger, Bob Clark, Celia Gomez Cora, John Davis, Jeff Delson, Clifford Dill, Mrs. A. Dunham, Stephen Edwards, Alice Eschelle, Anthony Eschelle, Henry Fitch, Jerry Johnson, Judy Jones, Richard Lattis, Mary Mickevich, Burt Monroe, Richard Montanucci, M. K. Montanucci, Charles Mueller, Charles Myers, Leland Payton, Joseph Pylka, Mrs. Osvaldo Reig, William Rinck, Michael Saboth, Vibeke Schiotz, John Simons, Edward Taylor, Joseph Tihen, George Tolland, Walter Whitford, Kelly Williams, Stephen Williams, Patrick Wooley, Patricia Worthington, Mary Zenisek. Other individuals present did not register.

CURRENT HERPETOLOGICAL TITLES, XIII: 1969 - 1970

Herpetological Information Search Systems
American Museum of Natural History
New York, N. Y. 10024

We have brought to your attention some 12,000 current titles in the pages of this journal to date. This list brings the titles of papers published in 1969 to a new high for one year, 4,118, and there are still more to go.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts-Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses especially.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1969-1970) that is concerned with a member of a Recent order of amphibians or reptiles.

HERPETOLOGICAL REVIEW will appear bimonthly, beginning in 1971. This means that the titles published here will be even more current. Further, the added issues will serve to reduce the titles-per-issue to a more manageable number.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This list contains titles of books and articles that have come to our attention during the period 8 October 1970 through 31 December 1970. The list is divided into two separate, alphabetically arranged sections: one for titles published in 1969, and one for titles published in 1970.

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Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 29 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

HERPETOLOGICAL
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OFFERS:

COPIES of original descriptions or other important literature.

DRAWINGS of important taxonomic features.

CONSULTATION on projects involving amphibians and reptiles, their literature, morphology, ecology....

SPECIAL BIBLIOGRAPHIES on amphibians and reptiles, restricted by subject and/or taxon and/or geography.

"CURRENT TITLES" for 1971 on Library Cards, about one-third of them with abstracts. Also available for 1968, 1969, and 1970 (3,000 to 4,000 titles per year; Library of Congress stock, hole-punched, alphabetical).

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UNREVIEWED-UNEDITED
COMMUNICATIONS
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CHROMOSOMES OF A NEW GUINEAN MICROHYLID FROG, COPHIXALUS RIPARIUS ZWEIFEL

C. J. Cole and R. G. Zweifel

The following is presented as a contribution to the extremely meager knowledge of karyotypes of the Microhylidae. The junior author obtained the specimen analyzed while participating in the Research Vessel Alpha Helix Expedition to New Guinea in 1969 (funded by the National Science Foundation through the Scripps Institution of Oceanography, University of California).

Chromosomes of 63 bone marrow cells at mitotic metaphase were examined on slides prepared by means of the colchicine, hypotonic citrate technique used by Cole, Lowe, and Wright (1968). The adult female frog, American Museum of Natural History (AMNH) 82987, was collected at Tambul, 7300 ft. elev., Western Highlands Dist., Territory of New Guinea, in July 1969.

In all instances, the diploid number of chromosomes was 26: 10 relatively large and 16 distinctly smaller. The metaphase-spread selected for illustrating the modal karyotype (Fig. 1) is the one illustrated in the 101st Annual Report of the American Museum of Natural History (1970: 8).

Of the five pairs of larger chromosomes, number 5 is clearly metacentric, number 1 is metacentric to submetacentric, numbers 2 and 4 are submetacentric, and number 3 is subtelocentric. Although numbers 2, 3, and 4 are similar in size, usually number 3 is recognizably different in centromere position. The ten pairs of smaller chromosomes (none is small enough to qualify as a microchromosome) are all metacentric or submetacentric; most pairs are not individually recognizable because of similarities in size and centromere position. No heteromorphic pair of chromosomes was recognized.

Consistent secondary constrictions were not found, although "gaps" (presumably unstained bands or threads) were occasionally observed at three sites: in one cell, near the centromere on the long arm of one chromosome number 2; in four cells, near the centromere on the long arm of one chromosome number 3; in six cells, near the centromere on approximately chromosome number 9 or 10 ("gaps" appeared on both chromosomes of the pair in one cell). The last site is similar to the position of consistent secondary constrictions in some ranids with karyotypes similar to that of Cophixalus riparius (see below).

The following discussion is based on the subfamilial classification of the Microhylidae advocated by Parker (1934), except that we follow Poynton (1964) in referring Phrynomerus to the Microhylidae (subfamily Phrynomerinae) rather than to a monotypic family. Prior authors have reported examining chromosomes from a total of only eight species of microhylids, representing three subfamilies (Table 1). In addition to the karyotype described here, we present (Table 1) chromosome numbers for two more species from New Guinea, but the material is not adequate for detailed analysis.

Of the microhylids examined, the chromosomes of only three species have been prepared and illustrated in such a way that they can be compared in detail with those of Cophixalus riparius. The three species are Kaloula pulchra, Breviceps gibbosus, and Phrynomerus bifasciatus; each represents a different subfamily (Table 1). The chromosomes of C. riparius are most like those of P. bifasciatus, not only in number, but also in such details as size groups and centromere positions. Indeed, the only conspicuous difference between the karyotypes of C. riparius and P. bifasciatus is that in P. bifasciatus chromosome number 2 has a more median centromere.

Chromosome number presumably is identical (Table 1) in two species of Cophixalus (subfamily Sphenophryninae) and in an Asterophrys (undescribed species, subfamily Asterophryinae), which is consistent with the supposed close relationship of these subfamilies (Parker, 1934). Whether Cophixalus (Sphenophryninae) is more closely related to Phrynomerus (Phrynomerinae) of Africa than to Breviceps (Brevicipitinae) of Africa or to Kaloula (Microhylinae) of Asia, as might be incautiously inferred from the scanty information available, remains to be seen.

One might hope that karyotypic data could contribute evidence bearing on the problem of whether the microhylids and ranids are closely related (for example, see Kluge and Farris, 1969), or whether the microhylids are more primitive and not so closely related to the ranids (for example, see Hecht, 1963). Thus one is tempted to compare frog karyotypes at the family level, particularly inasmuch as they have been described for representatives of most families. However, the data available are too scanty to contribute meaningfully to this

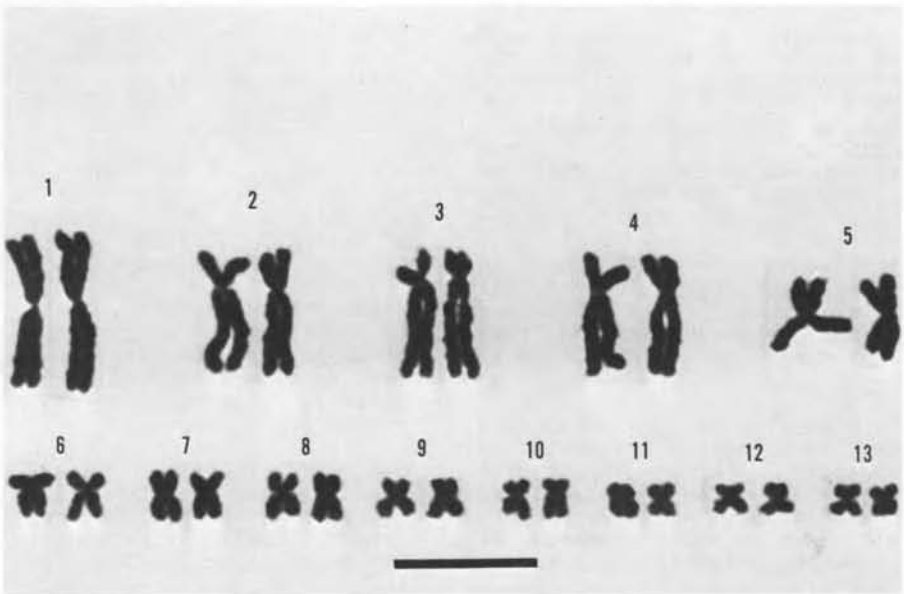


FIG. 1. Karyotype ($2n = 26$) of a female specimen of Cophixalus riparius (AMNH 82987). Line represents 10 micra.

TABLE 1. REPORTED CHROMOSOME NUMBERS IN MICROHYLID FROGS

SPECIES	SUBFAMILY	CHROMOSOMES	REFERENCE
Kaloula borealis ("Cacopoides tornieri")	Microhylinae	2n = 28, n = 14	Sato, 1936
Kaloula pulchra	Microhylinae	2n = 28	Morescalchi, 1968a, b
Uperodon systoma ("Cacopus systoma")	Microhylinae	2n = 26	Natarajan, 1953
Microhyla rubra	Microhylinae	2n = 26	Bai, 1956
Ramanella variegata	Microhylinae	2n = 26	Bai, 1956
Gastrophryne carolinensis	Microhylinae	2n = 22	Morescalchi, 1968b
Breviceps gibbosus	Brevicipitinae	2n = 24, n = 12	Morescalchi, 1968a, b
Phrynomerus bifasciatus	Phrynomerinae	2n = 26	Morescalchi, 1968a, b
Cophixalus riparius	Sphenophryninae	2n = 26	Reported here
Cophixalus cryptotympanum	Sphenophryninae	n = 13	Reported here (1); specimen AMNH 74925
Asterophrys sp.	Asterophryinae	2n = 26, n = 13	Reported here (1); specimen AMNH 74898

(1) Testicular squashes prepared by methods used by Duellman and Cole (1965).

question, and only a few observations can be made at this time.

Among the various frogs for which more or less directly comparable data on chromosome sizes and shapes are available, the chromosomes of Cophixalus riparius (and also Phrynomerus bifasciatus) closely resemble those of species belonging to three different families: Ranidae, Rhacophoridae, and Leptodactylidae. More than 15 species of ranids have been examined, and most of these have karyotypes strikingly similar to that of C. riparius (for examples, see Seto, 1965; Morescalchi, 1967; Natarajan, 1958a). Only one species of rhacophorid (Rhacophorus maculatus) has been analyzed in detail recently, and its karyotype is closely similar to that of C. riparius (see Natarajan, 1958b). The leptodactylids are more thoroughly represented by karyotypic data in the literature and show considerable chromosomal variation. At least two species (Cycloramphus asper and Oocormus microps) have karyotypes resembling that of C. riparius (see Becak, Denaro, and Becak, 1970). Other species of anurans that have the same chromosome number as Cophixalus riparius (2n = 26) have much less similar chromosome morphology and thus are not considered further here.

In conclusion, too few data are presently available to suggest likely hypotheses regarding the evolutionary significance of karyotypic similarities and differences at either subfamily or family levels.

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UNREVIEWED-UNEDITED COMMUNICATIONS
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ON THE PROBLEMS OF HOME RANGE MEASUREMENT AND INDIVIDUAL RECOGNITION IN LIZARD ECOLOGY STUDIES

William W. Milstead

During the time a recent paper of mine (Milstead, 1970) was going through the editoral process, reviewers of the manuscript touched on two problems which I think are badly in need of solution. One of these has to do with the methods by which home range sizes are measured, and the other concerns our lack of knowledge about the ability of lizards to recognize each other.

The measurement of home range size for lizards that live on relatively level land is no great problem. All that is needed are a few measurements, some graph paper, a pair of scissors, and an analytical balance. But with lizards living in three dimensional habitats (canyon walls, boulders, fence posts, trees, etc.) the problem becomes more difficult, because the amount of surface area involved undoubtedly has a direct bearing on the size of the lizard's home range. In nearly 15 years of working with the canyon lizards of western Texas, I have thought of only one method that would accurately yield information on home range size: after the boundaries of the home range have been delimited in the field, a portable paint spray apparatus could be used to spray the area with water (or water containing a vegetable dye), and under similar conditions of humidity, a known flat area such as a basketball or tennis court could be sprayed. Comparison of the volumes of water used for the two areas would yield the area of the lizard home range by ratio. I have yet to test this method because I keep hoping that someone will come up with a better or easier method.

In my paper I referred to Carpenter's (1967) statement that we have little evidence that lizards have the ability to recognize each other, and later I noted that Sceloporus merriami appears to be monogamous during the late summer with the male and female both defending the same territory. One of the reviewers raised the question of how these lizards could be monogamous without challenging their partners each time they come around a rock? The same reviewer also pointed out that the lizards seemed to be able to recognize an intruding male or female in the territory. Although these do appear to be cases of individual recognition, another possibility is that the lizards are responding to a set of very subtle signals without actual recognition. In my opinion, recognition of a set of signals is probably the best explanation for recognition of an intruding male or female, but it may not be the best explanation for the recognition between a male and female occupying the same territory. It will be of great aid to our interpretations of lizard behavior if someone can devise a study that would give evidence that a lizard can (or cannot) actually recognize its mate and other lizards living in adjacent territories.

I am grateful to Drs. Richard F. Myers and James L. Vial for critically reading the manuscript.

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GEOGRAPHIC DISTRIBUTION PAGE

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During recent years an ever-increasing number of journal editors have decided not to publish new records of geographic distribution. This decision was due in part to the feeling of some that "County Record" papers were unworthy of publication in their journals. No doubt some poorly-written papers, consisting mainly of detailed descriptions of a single specimen of some common species found 300 yards west of the previously-recorded range, were not worth the time, effort, and cost of entering them into the journal record. These decisions have been pressed also by the rapid rise in the costs of publication, with the average journal page costing $30 to $40 to print, with perhaps twice this much tied up in the reviewing and editing process.

It is for these reasons that many range extensions recently have been referred, for example, to Roger Conant for inclusion in his maps, rather than being accepted for publication.

It is our belief, however, that such new information deserves an adequate public record. We are pleased, therefore, to announce that George Zug (USNM) has offered to edit a page of such records, which can be published here at no more than $20 per page. The proposed format will provide the minimum information that is necessary for an adequate record: the species, precise locality, date of observation, disposition of specimen, and author. This will allow any interested worker to trace the origin of questioned geographic records, and to determine the data on which they are based.

Those persons who believe that some geographic record deserves more than this minimum presentation can, of course, submit it as an "Unreviewed-Unedited Communication."

Please send all geographic information for inclusion to Dr. Zug (see "Contents" page). -- HGD.

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UNREVIEWED-UNEDITED COMMUNICATIONS

AN INSTANCE OF CANNIBALISM IN CROTALUS LEPIDUS (SERPENTES: CROTALIDAE)

Michael A. Williamson

Documented accounts of cannibalism among ophidians are rare in published literature. In 1955, W. J. Hamilton and Joseph A. Pollack published a stomach contents analysis study on 70 crotalid snakes from Fort Benning, Georgia. Their study revealed the ingestion of five ophidians, none of which were crotalids. Snakes accounted for approximately 8% of all ingested food items. Their study revealed no instance of cannibalism. Klauber (1956, p. 586) states "we may conclude that cannibalism among rattlesnakes in the wild is quite unusual; and, in the rare instances when it has occurred, the snake eaten has sometimes been dead before it was swallowed."

On August 11, 1962, Ted L. Brown, accompanied by the author, collected a large female Green Rock Rattlesnake (Crotalus lepidus klauberi) in Water Canyon, Magdalena Mountains, New Mexico; at an elevation of approximately 7300'. This snake later proved to be gravid. It was taken to the University of New Mexico, placed in a wooden, glass-fronted cage, and provided with a dish of water for drinking. There it gave birth to 4 young on August 29.

On November 20, one young snake ate a brood mate. Five days later it, in turn, was eaten by the adult female. A third died on November 25. The fourth member of the brood was given to the author.

This is an unusual sequence of events which may have been brought about in part by the conditions of captivity, including the artificially-enforced proximity of brood mates and their mother.

I wish to thank Dr. William G. Degenhardt for providing the records on which this note is based. I am also indebted to John S. Applegarth for reading the manuscript and offering helpful suggestions.

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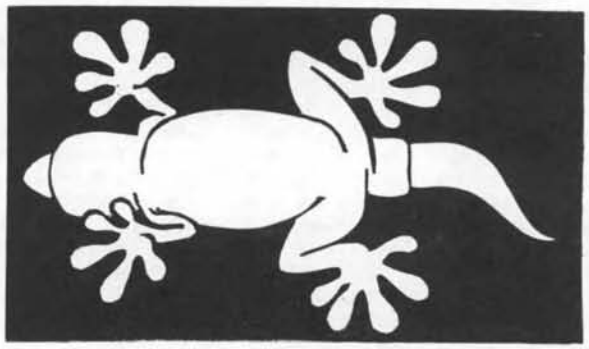
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RECENT PUBLICATIONS

THE HYLID FROGS OF MIDDLE AMERICA. By William E. Duellman, illustrated by David M. Dennis. 1970. Two volumes, approximately 680 p., 324 fig., 72 pl. (32 in color). Will be reviewed in a later issue. (Available from Mus. Nat. Hist., Univ. Kansas, Lawrence, Kans. 66044. $25.) The prints of David M. Dennis' paintings are sold in sets of eight for $1 per set, as follows, plates 41-48, 49-56, 57-64, 65-72. Orders are received by the Publications Secretary, Museum of Natural History, University of Kansas, Lawrence, Kansas 66044. Checks should be made payable to "Museum Store."

POISONOUS SNAKES OF THE WORLD. Bureau of Medicine and Surgery, Department of the Navy. 1968 (Reprinted 1970). A revision of the 1962 book of the same name. Completely rewritten (in 1965) by S. A. Minton, H. G. Dowling, and F. E. Russell (general editor, Comm. G. M. Moore, MSC, USN). 212 p., 120 fig., 8 col. pl. (Available from Supt. Documents, Government Printing Office, Washington, D.C. 20402. $3.25.)



CARIBBEAN RESEARCH PAGE

Many of us are aware, in a general way, that many persons and institutions have research activities in the Caribbean region: the Harvard group on anoles, Albert Schwartz on various amphibians and reptiles, a crocodile conservation project, a Virgin Islands project, and, of course, the long-standing work on sea turtles by Archie Carr's group. The work is being done by so many persons from so many institutions, however, that no one has a clear picture of the entire range of activities.

When I was recently in Jamaica, I was told that groups from Florida, Harvard, the USNM, and other institutions were either on the island -- or were expected -- or had been there in recent weeks. I was unable to get in touch with any of them, though, because no one had the details on who, where, and when.

We believe that a record of such information would be of benefit to all. Therefore, we are happy to announce that Jack McCoy (CM) has agreed to edit a page on Caribbean persons and projects -- past, present, and proposed. If you are involved, don't wait for Jack to write you, give him the information now! His address appears on the "Contents" page. -- HGD.

CONNECTICUT HERPETOLOGICAL SOCIETY

GEORGE VESPER (Vice-President, CHS) has been named Director of Roaring Brook Nature Center in Canton. DON LAWYER has taken over as Bulletin Editor. DICK PETERSON will be Public Relations Chairman. BOB DUBOS and NORM SCOTT are gathering distributional data of the amphibians and reptiles of the state.

NEW YORK HERPETOLOGICAL SOCIETY

The NYHS has announced its 1971 Photo Contest, which will be broken down into "Amateur" and "Novice" categories. Further information can be obtained from the Society, P.O. Box 3946, Grand Central Sta., NYC 10017.

H. G. Dowling (AMNH) spoke to the members on "The Crisis in Herpetological Information," on 16 January 1971.

Richard G. Zweifel (AMNH) will present an illustrated, "New Guinea: Herpetological Travelogue," on 13 February.

EASTERN SEABOARD HERPETOLOGICAL SOCIETIES

On Saturday, 17 October 1970, representatives of the PHILADELPHIA HERPETOLOGICAL SOCIETY, the NEW YORK HERPETOLOGICAL SOCIETY, the VIRGINIA HERPETOLOGICAL SOCIETY, the NORTHERN VIRGINIA HERPETOLOGICAL ASSOCIATION, and the MARYLAND HERPETOLOGICAL SOCIETY met at the Philadelphia Zoo to discuss plans for future cooperation and coordination.

A general discussion took place concerning proposed cooperation between and among the various groups, and possible joint meetings. BOB TUCK (Pres., MHS) announced that the MARYLAND H. S. would sponsor a joint meeting at the Baltimore Zoo (Druid Hill Park) on 17 December 1970. DAVE HULMS (Pres., NYHS) agreed that the N.Y. HERPETOLOGICAL SOCIETY would host a joint meeting, at either the Staten Island Zoo or the Bronx Zoo on 17 July 1971. MALVIN L. SKAROFF (Pres., PHS) announced that it was the intention of the Philadelphia group to host some joint activity during the AAAS meetings in Philadelphia (26-31 December 1971), during which the HERPETOLOGISTS' LEAGUE annual meeting will be held.

A joint meeting of officers and delegates was held 19 December 1970 in the new Hippo House of the Baltimore Zoo. The proceedings were called to order by ROBERT TUCK (Pres., MHS) shortly after 3 PM. Arthur Watson (Director of the Zoo) welcomed those present. FRANK GROVES (Head Keeper of the Reptile House) invited everyone to a tour after the meeting. Officers of other societies were then introduced. They included FRANK TOEBE (VHS), MALVIN L. SKAROFF (PHS), BARRY SCHOOR (NYHS), and FRANK WATROUS (NVHA).

Five papers were presented:

ANTHONY JANDA (Park Naturalist-Director, Brookside Nature Center, Wheaton, Md.) spoke on "The Role of the Nature Center in Environmental Education." He pointed out that most adults who come to the Center are already aware of environmental problems, and that the main emphasis must be on education of the young. They are taught as early as pre-school, and the programs work up into longer and longer programs by high school. They encourage the children to touch the specimens exhibited and to go into the field to get the feeling of being a part of nature.

GEORGE BREWSTER (nature photographer, Arlington, Va.) showed slides and played taped calls of all of the frogs and toads of Montgomery County, Maryland. He mentioned that it took two years to complete this impressive collection.

CHRISTOPHER H. DODGE (Biologist, U.S. Department of the Navy) spoke on his studies on the growth of young turtles. He reported that optima were 30 degrees (C) temperature, 24 hours light, and feeding with lean ground meat mixed with fish, bone meal, and poly-vitamins. He also reported that red-ear turtles had greater growth when centrifuged at the equivalent of 5 times normal gravity.

PETE WEMPLE (Vice-Pres., MHS) reported on the collection of the Eastern spiny softshell turtle, Trionyx s. spinifer, in Garrett County, Maryland. In company with Jeremy Jacobs, he collected some specimens on 22 September 1970. Although the species had been mentioned as having been found in the state, these are the first recorded specimens (deposited in the Natural History Society of Maryland and the USNM).

DON MORIZOT spoke on the distribution of the Long-tailed salamander within a cave in Washington County, Maryland. He investigated the location of specimens inside the cave at different seasons and found significant variation. He postulated that the animals move toward areas in the cave which are more humid.

A. JAMES BARTON (Director, Undergraduate Student Program, NSF) led a short group discussion on the effects of environmental disturbance on the survival of rare amphibians and reptiles. He is especially interested in the Bog turtle, and reiterated his plea that anyone having knowledge of the possible loss of a Bog turtle habitat because of changes in land use, or for any other reason, to forward the information to him.

The meeting ended at 6PM. There were approximately 100 people present, who were all well-pleased with the program.

RENE KATZ-BRAUNSCHWEIG (Advisor, NYHS) reminded all present of the joint meeting in New York on 17 July 1971. MALVIN L. SKAROFF (Pres., PHS) reiterated his welcome to attend the joint meeting at the Philadelphia AAAS meetings, in conjunction with the HERPETOLOGISTS' LEAGUE.

MARYLAND HERPETOLOGICAL SOCIETY

BOB TUCK (President) writes: "You will find us in the forefront of the battle to save the environment. We make no pretentions of being professionals, but we do represent a considerable force at the professionals' disposal." The Society heeded Bustard & Limpus' plea for the Flatback sea turtle, Chelonia depressa (HERPETOLOGICA 25(1): 29-34) and registered a protest to the Woongarra Shire

Council, Commonwealth of Australia, on the proposed subdivision and land development adjacent to the turtle's nesting site. It also publicly praised the action of the City of Bowie, Maryland, in passing the nation's first city ordinance banning the sale of soft drinks and beer in non-returnable containers, and "we alerted the Eastern Seaboard Herpetological Societies to this history-making development."

Some of the 1971 activities include:

20 Feb. STANTON ERNST, JR. (Gulf Nature Center, Arlington, Va.) "The role of the Nature Center in Herpetological Education."

20 Mar. PETER MUNDEL (Dept. Zool., Univ. Md.) "The ontogeny of photoxic responses in the Red-spotted newt, Notophthalmus v. viridescens."

17 Jul. Second Combined Meeting, ECHS, New York. Hosted by NYHS.

16 Oct. The Honorable Lawrence J. Hogen (Fifth District, Md., U.S. House of Representatives), "Legislative aspects of conservation and wildlife protection."

28 Dec. Third Combined Meeting, ECHS, Philadelphia, Hosted by PHS.

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1970 DEGREES

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PAUL J. CONZELMANN (MS, U SW La), "The breeding behavior and movements of the small-mouthed salamander, Ambystoma texanum, in southwestern Louisiana."

EARNEST D. ASHURST (MS, U SW La), "The cranial osteology of the neotropical vine snake, Oxybelis aeneus (Wagler)."

JOHN PERRIN (MS, U SW La), "A comparative study of the morphology of the heart and associated vessels of Louisiana watersnakes of the genera Natrix and Regina."

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MEMBERS DESIDERATA

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JAMES E. DeWEESE (Allan Hancock Found., U.S.C., Los Angeles, Ca. 90007) would like to receive living scincid lizards for use in karyological studies.

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ANIMAL DEALER

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ROBERT C. GADSBY warns that an animal dealer addressed as:

Doctor C. S. Tseng
TAIWAN TROPICAL BIOLOGY SUPPLY CENTER
Dun Hwa South Road, Lane 351, No. 64
Taipei, Taiwan, Republic of China

has cashed checks sent to him, but so far has failed to provide the requested animals or to answer letters and cables.

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MEETINGS

AND

SOCIETIES

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CALENDAR 1971

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12-16 April....FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Annual Meeting, Chicago.

15-19 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Los Angeles.

19-22 August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Univ. New Mexico, Albuquerque (cosponsored by the HERPETOLOGISTS' LEAGUE).

29 August - 4 September....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Colorado State Univ., Fort Collins.

28-29 December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Philadelphia (with AAAS; cosponsored by the SSAR).

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INDIVIDUALS

AND

INSTITUTIONS

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RICHARD J. BALDAUF (Texas A & M) was appointed Chairman, Texas Academy of Science Conservation Committee.

ERNEST C. TANZER (U Ariz) received a SIGMA XI grant toward his study of the functional anatomy of the jaw apparatus of Agkistrodon, Crotalus, and Sistrurus.

KENNETH L. WILLIAMS (NW St. U, La) has completed his studies of the taxonomy of Lampropeltis triangulum.

BILL THORNTON (Angelo St U, Texas) received a Faculty grant toward his biochemical and cytological study of the genus Tantilla.

JAMES SCHWARZ (McLennan Comm Coll) had his NSF grant extended for his studies of head-bob patterns in Sceloporus poinsetti.

SHERMAN & MADGE MINTON have started another book -- this time on "Giant Reptiles."

WARREN WALKER (Oberlin) has returned from a year's work at the Anatomical Institute (Frankfurt), where he was able to complete some papers on limb musculature and locomotion in turtles.

ERNEST E. WILLIAMS (MCZ) recently was appointed Professor of Biology, in addition to his curatorship.

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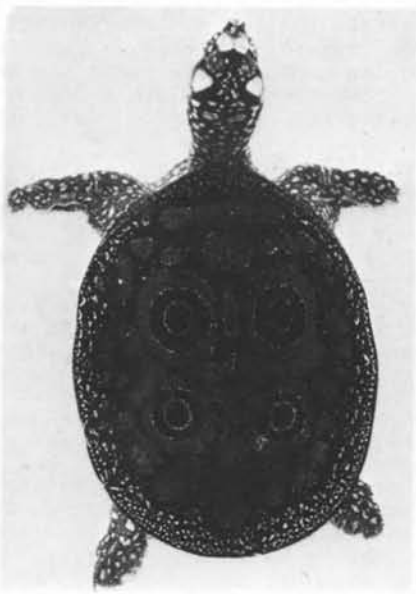
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AFRICAN BIBLIOGRAPHY (1860-1960)

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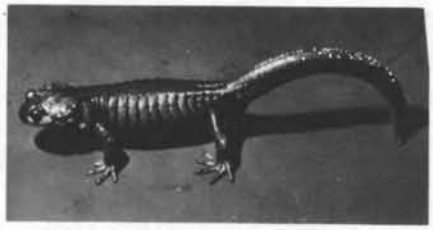
A bibliography of African herpetology was prepared by Arthur Loveridge (MCZ) and updated to 1960 by Raymond Laurent. The Museum of Comparative Zoology was unable to obtain funds (e.g., from NSF) for its publication and has given the manuscript to HISS. The MS consists of some 581 pages, of which 52 are introductory material (mostly journal abbreviations). Although it will be some time before we are able to incorporate these titles into our computerized bibliography, we will try to aid anyone who needs bibliographic aid on African herpetology.

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Trionyx hurum Gray, the little-known Burmese soft-shelled turtle, retains a juvenile pattern of well-defined ocelli. Similar markings are seen on young specimens of related Asian Trionyx and Dogania, hatchlings of some emydid turtles, and even Chelys fimbriatus, which belongs to another suborder. The value of this coloration -- often considered as aposematic -- is puzzling in such an old type of reptile, which reentered water during its evolution. In addition, T. hurum spends much of its time under mud, as do the related American species.

The turtle in the photograph is a juvenile specimen, carapace length 123 mm, width 96 mm, weight 193 g; in captivity 1 1/2 years. -- W. Sachsee (Ricarda Huch Str. 6, 65 Mainz, Germany).



Defensive behavior of the salamander, Ambystoma gracile. The tail and head are lashed against the predator. The white globules on the skin are noxious secretions from the granular glands. -- Edmund D. Brodie, Jr. (Zoology, Clemson U., Clemson, S.C. 29631).

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STULL'S "BOIDAE"

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Unknown to most workers, Olive Griffeth Stull continued her work on the systematics of boid snakes until a short time before her death, and left an almost-complete manuscript. This MS is now in HISS's files. It consists of several hundred typed (but unnumbered) pages of systematic accounts of the genera and species of boids, drawings of color patterns and (inverted and split) hemipenes, tables of scale counts and measurements, and outline maps for both genera and species. Lacking are an introduction, key, and familial summary.

The overall format of the accounts is like those in her Pituophis (1940, BULL U S NAT MUS (175)) paper. None of the sections appears to be ready for publication, but anyone who is working on boid taxonomy should know of the existence of this work. We will try to make appropriate parts available to those workers who need them.

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LOST MEMBERS

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RICHARD DUNN, P.O. Box 613, Arcadia, Cal. 91006

SAUL FRIESS, 10 Eighth Ave., Brooklyn, N.Y. 11217

FRANK L. HILL, Route 6, Box 962, Bessemer, Ala. 35020

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RECENT DEATHS

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PAUL V. TERENTJEV (30 DEC 1970). Russian herpetologist, Honorary Member of the Herpetologists' League.

ALEXANDER G. RUTHVEN (19 JAN 1971). American herpetologist, founder of the "Michigan school" of systematic monographs on amphibians and reptiles.

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CHANGES OF ADDRESS

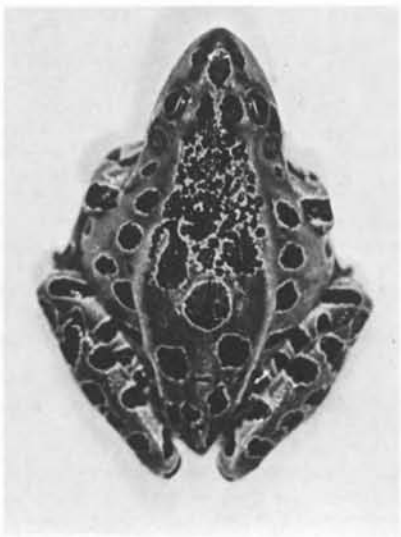
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HISS now provides mailing lists for the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES and the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES. With this issue, the HERPETOLOGISTS' LEAGUE mailing list has also been added to our computerized file.

PLEASE SEND CHANGES OF ADDRESS for any of these activities directly to us, we will inform the appropriate officers.

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS
Department ML
American Museum of Natural History
Central Park West at 79th St.
New York, N.Y. 10024

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Unusual spot pattern of a Leopard frog (Rana pipiens). The dorsal reticulations are somewhat similar to the pattern of the kandiyohi mutant, but are more sharply delineated against the light background and are of a more restricted distribution. The specimen was an adult female that was part of a shipment of Rana pipiens from a biological supply company in Minnesota. -- Lauren E. Brown (Biological Sci., Illinois State U., Normal, Ill. 61761).

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PERMITS FOR SCIENTIFIC EXPEDITIONS TO BRAZIL

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Following is an English translation of the Brazilian Congressional Decree approving the regulations for permission to conduct scientific expeditions in Brazil. This information was made available to William E. Duellman by Dr. Bertha Lutz and Dr. Antonio Moreira Couceiro, Presidente, Conselho Nacional de Pesquisas. Information concerning, and applications for, permits should be addressed to: Presidente, Conselho Nacional de Pesquisas, Av. Marechal Camara 350, Rio de Janeiro, GB. ZC. 39, Brazil.

Decree No. 65.057 -- of August 26, 1969

Art. 1 - The supervision of Scientific Expeditions in Brazil, entrusted to the National Research Council of Brazil under Decree no. 62.203, of January 31, 1968, shall be governed by the terms of the present Decree.

Art. 2 - For the purposes of the present Decree, a Scientific expedition shall be considered as the displacement of human and material resources to a given geographic area, for a limited period of time, with a view to developing a specific plan to obtain scientific data and knowledge, to confirm or establish theories, thus endowing it with a broader scope than that of simple research to evaluate natural resources.

Art. 3 - The present Decree shall not apply to: a) activities governed by Decree no. 63.164, of August 26, 1968, when carried out on the continental shelf, on territorial ocean waters and on interior waterways; b) research lying within the monopoly rights of the Union or within the competence of other Agencies and Ministries, governed by specific regulation.

Art. 4 - It is the duty of the National Research Council, excepting in the aforesaid restricted cases, to authorize and to supervise scientific expeditions or any other activities involving the exploration, survey, collecting, filming or recording of scientific material effected by: a) foreign institutions or individuals, in an official or private capacity; b) foreign religious or philanthropic associations, established in the country; c) Brazilian institutions working in collaboration with foreign institutions or individuals; d) national private institutions or individuals. [Authorization under letters a, b, and c, as well as under letter d, shall be previously submitted to the National Security Council, whenever the expedition areas concerned be considered vital to National Security, or the research involved be considered of interest to National Security.]

Art. 5 - Any Government official who ascertains that foreign members of expeditions cleared under the terms of the present Decree are carrying out activities contrary to the national interest, or effecting research legally classified as within the Union Monopoly, shall inform the Ministry of Justice thereof, so that a legal suit for expulsion may be filed, in accordance with official legislation in force.

Art. 6 - It is the duty of the National Research Council of Brazil, under the terms of Decree no. 62.203, of January 31, 1968: a) to study the aims of scientific expeditions and correlated activities, from the angle of their interest to national research; b) to decide as

to the integrity and merits of organizations or individuals wishing to carry out scientific expeditions or correlated activities, and as to the convenience, from the point of view of national interest, of granting the permit requested; c) to study, with the assistance of the relevant agencies whenever necessary, the aims, routes and plans presented; d) to inform the relevant authorities of the decision on the application for permits; e) to supervise, directly or by delegation, the activities authorized; f) to appoint delegates in the States and Territories, when the supervision cannot be effected under the terms of letter e; g) to appoint its representatives to accompany the expeditions governed by article 4; h) to withdraw the permit granted, whenever there be a breech of the regulations under this Decree; i) to state its opinion and to request that of the Ministries, should the matter be within their jurisdiction, on the exportation of any specific material collected within the national territory; j) to advise, and exchange information with, the relevant Ministries and official agencies on the results obtained by scientific expeditions.

Art. 7 - Applications for permit shall be addressed: a) directly to the National Research Council, when the expedition or activity be proposed by a national organization or individual, by a foreign religious or philanthropic association established in the country, three months before the date for starting the operation; b) to the Ministry of Foreign Relations, through diplomatic channels, when the expedition or activity be proposed by a foreign organization or individual, 180 days before the date set for arrival in Brazil.

Art. 8 - Applications for permit to carry out expeditions and other scientific activities, shall contain: a) a detailed and precise statement of the purposes thereof; b) name, address, nationality and reports on previous activities in the national territory, if any, of the organization or individual responsible for the financial support of the activities proposed; c) name, address, nationality and reports on previous activities, in the national territory, if any, of the organization or individual responsible for the carrying out of the activities proposed; d) name, "curriculum vitae" and nationality of the person in Brazil responsible for the activities and of the person designated to act for him in any possible absence; e) name, address and nationality of the participants; f) routes and plans; g) type of material to be collected and destination thereof; h) detailed inventory of equipment and arms to be carried; i) duration of the expedition; j) specification of the customs station, chosen from among those listed by the Council, through which the material collected will be exported; k) formal statement of intention to abide by the laws in force in this country and by the provisions of this Decree.

Art. 9 - All the information demanded in the previous article together with the decision of the National Research Council thereon shall be included in the documents to be submitted to the authorities mentioned in article 4, for appropriate scrutiny.

Art. 10 - In order to obtain extension of a license period, the interested parties shall apply to the National Research Council to that effect thirty days before the existing license expires, stating the reasons for their request and presenting a report on the work already carried out. [The procedure for extention of the license period shall be the same as that for obtaining the initial permit.]

Art. 11 - The supervision of authorized activities shall be effected by the National Research Council, within the provisions under article 6: items e and f.

ss. 1. - Any material held by expeditions or participants thereof, collectors or researchers, in disagreement with the provision in the present Decree, or with the limitations established in the license involved, shall be confiscated.

ss. 2. - The material thus seized shall be handed over to an official scientific institution of the National Research Council's choice.

Art. 12 - The exportation of any collected, filmed or recorded material shall depend on the presentation to Customs, port of embarcation or post-office officials of the respective authorization given by the competent Ministry or Agency, based on the scientific pronouncement thereon of the National Research Council. [The exportation of any mineral or fossil material collected within the national boundaries shall be controlled by the Ministry of Mines and Energy, in accordance with the legislation in force thereon.]

Art. 13 - Prior to the granting of authorization, an appraisal and inventory of the material collected in the national territory shall be made, and the specimens to remain in the country, or to be returned in the course of time, to be added to collections of Brazilian official institutions, shall be specified. [The interested parties shall have the right to attend the examination of the material, either personally or through their representatives.]

Art. 14 - Holotypes shall be kept in Brazilian official institutions.

Art. 15 - For the purpose of being added to the collection of a national institution named by the National Research Council the following material shall be delivered to the latter: a) representative samples or duplicates of collections obtained; b) moulds, copies, photocopies or drawings of scientific material.

Art. 16 - The National Research Council, taking into consideration scientific ethics as well as the cultural interests of Brazil, shall determine, in each and every case, the ultimate destination to be given to unique or rare specimens.

Art. 17 - In the case of retention of material in Brazil, the National Research Council may entrust an official institution to decide, in cooperation with those responsible for its collection, on the destination of the same.

Art. 18 - The leaders of the scientific expeditions or correlated activities duly licensed, within 6 months of their departure from this country shall send the National Research Council a detailed report on their work in Brazil.

Art. 19 - The present Decree shall be in force as of the date of its publication, all provisions to the contrary being hereby repealed.

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BOOK REVIEW

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REPTILES OF OKLAHOMA. By Robert G. Webb. 1970. Stovall Museum of Science and History, University of Oklahoma, Norman. xi + 370 p., 120 figs. $3.95, paperback; $8.95 cloth.

"Long awaited" is an overworked part of the reviewer's lexicon, but the cliche has become reality with the appearance of Webb's REPTILES OF OKLAHOMA. This book had its origin in keys published by A. I. Ortenburger in the early 1930's, and in a dissertation prepared by Webb in 1952. Despite the lengthy delay in getting this work into print, it has been worth the wait. This is one of the best state reptile books available.

Webb recognizes 95 species and subspecies of reptiles in Oklahoma, and discusses another half-dozen "unverified, problematical, and probable species." Keys to orders, suborders and species are well-constructed, free from excessive detail, and easy to use. Scale terminology and diagnostic structures are illustrated by line drawings taken from various sources. Some of the illustrations would have been improved by selective cropping of unnecessary parts. Eleven species are polytypic in Oklahoma, and their subspecies are diagnosed in the species accounts.

Each of the 80 species accounts includes a succinct descriptive paragraph, intended to be used as an aid to identification, and a general statement of range in the state. Exhaustive lists of specimens examined, museum records, and literature records document the statement of range. A clear, full-page spot map is provided for most species, but these would have been greatly enhanced by the addition of inset maps showing total range. The well-spotted maps attest to the author's thorough approach to distributional data.

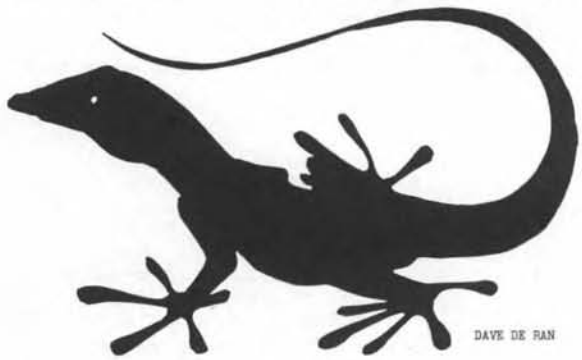
The species accounts also include bibliographic citations to the Oklahoma literature and quite a few original observations on habitat, feeding, reproduction and behavior of Oklahoma reptiles. Webb has analyzed carefully most problems of geographic variation in the state, and his discussions of these situations are models of clarity. Reviews of unsolved taxonomic and zoogeographic problems outline avenues for further investigations. In the few cases where data are incomplete, such as in Natrix erythrogaster flavigaster and Coluber constrictor priapus, the author frankly admits the limitations of his treatment.

The keys and species accounts form the backbone of this book, but it contains much more. A well-documented account of faunal regions, illustrated by photographs and maps, does remarkable justice to the great ecological diversity of Oklahoma. Faunal relationships of the reptiles are outlined in a skimpy chapter, but this subject could easily fill another 300 pages if treated incautiously. Oklahoma localities, confusing at best and frequently impossible, are discussed in another well-polished chapter. Several maps depict boundaries of the ameboid political units of pre-statehood days. Two of the best sections, both basically historical in content, treat previous herpetological work and type-specimens and type localities of reptiles in Oklahoma. A glossary, twenty-two pages of bibliography, and an index complete the volume.

In short, there is something here for everyone. There are solid raw data for the zoogeographer and systematist, good research leads for the advanced student, and usable identification aids for the novice. There is even a color painting of Crotaphytus collaris to delight George Miksch Sutton fans. This book is a sound contribution that effectively combines the utility of a handbook with the value of basic data. I recommend it as a worthwhile addition to any herpetological library.

C. J. MCCOY
CARNEGIE MUSEUM
4400 Forbes Ave.
Pittsburgh, Pennsylvania 15213

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BOOK REVIEW

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ANIMAL ELECTROENCEPHALOGRAPHY. By W. R. Klemm. 1969. Academic Press, New York. xii + 292 pp., 156 figs.

This relatively compact reference book is written with enough technical detail to provide a diverse group of readers with important general information and a rapid introduction to selected topics in EEG. A wider application of EEG techniques can be expected in the future. While the book strives to provide a theoretical framework which will enable the investigator to understand what he does, it also provides a useful tool to help him to communicate his findings to others. In Appendix A (p. 269-276) a "Proposal for an EEG Terminology by the Terminology Committee of the International Federation for Electroencephalography and Clinical Neurophysiology" is provided (reprinted from Electroenceph. Clin. Neurophysiol. 20: 293-320) with a glossary and equivalent terms in English, French, German, Italian and Spanish.

The 34 pages of references, author and subject indexes and the 156 figures enable readers with diverse objectives and academic backgrounds, to gain sophisticated understanding in selected topics of EEG.

ITZCHAK GILBOA
Herpetological Information Search Systems
AMERICAN MUSEUM OF NATURAL HISTORY
Central Park West at 79th St.
New York, N.Y. 10024

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A FURTHER REPORT ON GALAPAGOS TORTOISES

Peter C. H. Pritchard

Following Herndon Dowling's broad hint in the recent issue of Herpetological Review, I am happy to present this report of my trip to the Galapagos Islands early in 1970. My basic mission in the islands was to carry out a preliminary survey of the sea turtle populations that nest there. However, having a long-standing interest in giant tortoises, I was keen to visit as many of the tortoise populations as time and boat availability permitted. Only on James Island did we take a guide, yet we found tortoises with no trouble at all on all four islands where we looked for them. In fact, I was very happily surprised by how evident the native Galapagos fauna was, although it is true that we also came across many goats on James and northern Indefatigable, donkeys on James and Albemarle, and pigs on James and southeast Indefatigable. The oft-mentioned rats of Duncan Island, which are thought to have prevented the native tortoise race from reproducing successfully for seventy years, appeared to be at a very low ebb; I saw no live rats and only one old, bleached rat jawbone. Probably the prolonged drought had caused a massive population drop in the rodents, though the native reptiles of the island, well adapted to arid conditions, appeared to be doing well. The endemic lava lizard, Tropidurus duncanensis, was very abundant in the higher parts of the island.

Van Denburgh found no tortoises anywhere at the western end of James in 1906, but even today it is possible to find tortoises within about an hour's walk of James Bay. One old female tortoise has been imprisoned in a steep-walled crater at the southern end of the Bay for many years. the floor of the crater is about 600 yards in diameter, and is mostly covered with low bushes. I climbed into the crater on February 6 and eventually found the old tortoise under the very last bush in the whole crater. It seemed to be in good health though was fairly light for its size, probably being somewhat dehydrated; the only standing water in the crater was saturated brine, and the air was exceedingly hot and still. However the tortoise and the numerous goats in the crater seem to be able to extract sufficient water for survival from the vegetation.

James Island is usually described as lacking human inhabitants. However, for the last five years one man, an Ecuadorian named Leonardo Apolo, has lived at James Bay, caretaker of an abandoned and bankrupt salt mine. He knew where we could find more tortoises on James, and on February 10 we set out together to find them. We drove by tractor to the salt mine, about half a mile inland, then struck out into the interior on foot. Before long we came across tortoise droppings (consisting mainly of barely-digested manzanilla), and within an hour and ten minutes of setting out we found a large male tortoise resting under a bush. Another male was only a few yards away; when we found it, it was eating large numbers of manzanillas, but soon it walked over to the first tortoise and started biting at its legs. In the general vicinity we found two more tortoises - these too were both adult males; and in a crevice I found the complete skeleton of an adult female. This tortoise had been blind in one eye, since the skull was asymmetrical and there was no space for the left orbit. This deformity was presumably the reason for its fatal fall.

Tortoises are still quite plentiful in the southwestern part of Indefatigable Island, and this area has been designated a tortoise reserve. This, of course, does not imply that those tortoises which are found wandering outside the reserve may be taken, but it does mean that the land within the reserve is not available for settlement or agriculture. I made the five-hour hike inland to the tortoise reserve on February 26, and was able to see several dozen tortoises in the vicinity of the "caseta," a small hut inhabited by two wardens. However, this time of the year was exceedingly dry, so there was no standing water, and the tortoises were widely dispersed. There are no good trails within the reserve, and although much of the country is easy walking, it is very easy to get lost; I found it advisable to take a canteen of water even on a very short walk. The Indefatigable tortoises are breeding quite well; the feral hogs, which eat tortoise eggs and hatchlings whenever they find them, are shot on sight, and are now considerably reduced in number. Whenever a tortoise nest is found by the National Park officials or by the game wardens, it is surrounded by heavy stones so that hogs cannot force an entry, and the young tortoises are released in thick vegetation. The hatchlings and young have a strong instinct to flee from bright light, so they remain



FIG. 1. Large male G. e. vandenburghi following a "tortoise trail" inside Volcan Alcedo, Albemarle Island.

well hidden and adequate numbers survive. In fact, the population is sufficiently dynamic for well over half of the tortoises to be small enough to be picked up by one man, though the occasional old male reaches perhaps 500 lbs.

Tortoises still exist on all five of the principal volcanoes of Albemarle Island, though the populations on the southern two mountains (subspecies elephantopus and guntheri) are down to a few hundred each; in former years they were heavily exploited by settlers, and now they are seriously harassed by feral dogs, cats, hogs, and other introduced mammals. The northern two populations (becki and microphyes) are reported to be in fairly good shape, and breeding; there is no human settlement on the northern part of Albemarle, and most feral mammals are confined to the south. A notable exception to this is the donkey, but fortunately this appears to be about the least harmful of the introduced mammals. However, there is always the danger of their trampling young tortoises or destroying nests by rolling on them, and ultimately it will be necessary to eliminate them.

The one place in the Galapagos where tortoises may still be seen in primordial abundance is on the central volcano of Albemarle, known as Cowley Mountain or Volcan Alcedo. There is no good landing place at the foot of Alcedo, so the crews of the old whaling vessels obtained their tortoise supplies elsewhere, and although Van Denburgh found an abandoned tortoise slaughter encampment on the mountain in 1906, apparently no one got into the actual crater until only a few years ago. The walk from the shore to the rim of the crater is exhausting and takes about twelve hours, but the substrate for most of the trip is soft pumice, and is the easiest walking terrain in the islands. I spent February 17 and 18 on Alcedo, camping the night on the rim of the crater. The terrain for a few miles inshore is very barren, even Tropidurus lizards being very scarce, and tortoises are not found until one has walked inland for some hours; in fact we had only found three tortoises, and they all small, by the time we reached the crater rim. But by walking round the rim itself, towards a steaming geyser which we could see half way down the opposite side, we found several dozen. There were also twenty or so tortoises sitting in a muddy pool into which the geyser had overflowed, and on the slope down to the crater floor, and on the floor itself, tortoises were continually to be seen on all sides. We must have seen 400 in one morning. About half of the tortoises were less than two feet long, while the smallest was only five inches, but the adult males were enormous, bigger than any I have seen in captivity. One monster measured 51 inches in a straight line (69 inches over the curve), and many were nearly that big. I saw two attempts at copulation - one prolonged and apparently successful, but in the other case the male had mounted the female from the wrong end. Otherwise the tortoises were either eating whatever vegetation was within reach, or walking along the amazing complex of trails they had engineered on the inner slope of the crater. On the floor of the crater a broad promenade which could only be called a tortoise super-highway stretched for hundreds of yards. We saw numerous donkeys inside and outside the crater. We also saw quite a number of donkey skeletons, but despite the great number of living tortoises we saw all around, we did not see a single dead tortoise or even an old skeleton.



FIG. 2. Male and two female Duncan tortoises (G. elephantopus ephippium) in their native habitat. The Pacific Ocean is in the background.

The only other tortoise population I visited was that on Duncan Island. It is amazing that this population has survived at all. Reproduction of the Duncan race has been virtually nil since the beginning of this century, when rats were introduced to the island. The island is very small (about three miles in diameter), and the tortoises have been subject to heavy collecting, not only by the old buccaneers and whalers, but also in the present century by scientific and quasi-scientific parties. Van Denburgh collected 86 tortoises from the island in 1905-1096, and up to about 1960, no Galapagos expedition was considered complete unless one or two Duncan tortoises had been collected. Nevertheless, it is estimated that about 100-150 tortoises still survive on Duncan, all of them very old.

I ascended Duncan from the south-west on February 25. After only about an hour's walk, I saw a tortoise on the trail ahead of me. It had its head high in the air and looked more like a small giraffe than a tortoise; however, when approached, it shyly withdrew its head and looked like a tortoise again. I wandered around in the area for a few hours, and found seven tortoises altogether - three males and four females. During the middle of the day, all were hiding under overhanging rocks or natural rocky cairns to escape the extreme heat. Despite the heat and the complete lack of standing water, one tortoise which I picked up squirted a considerable volume of limpid water from its bladder. I felt sorry to have made this tortoise relinquish its emergency water supply, and did not pick up any others.

The rats on Duncan Island consume practically every baby tortoise soon after it hatches (though Tjitte DeVries did recently find one yearling on Duncan which had been attracted by the banana in a trap he had put out to catch rats). However, during the last five years, a magnificant conservation program has been carried out which has changed the Duncan tortoise's prospects from very gloomy to very good.

Once a nest of eggs is located, it is marked and left *in situ* for several months. The eggs are then carefully removed and taken to an incubator at the Darwin Station, where an incredible 85% produce viable hatchlings. Over 100 young have now been hatched at the Station, and these are raised for five years before being released on Duncan at a presumably rat-proof size. The first release was due to take place shortly after I left the islands in March. The young are fed only on leaves, and so only reach a length of about one foot during these five years. It would probably be possible to increase the growth rate by feeding them on a synthetic diet, but many reptile keepers have found that reptiles which grow unnaturally fast tend to die suddenly; as it is, the post hatchling mortality of the captive Duncan tortoises is very low. Captive-raised hatchlings in San Diego reach a size of about one foot after three years or less, but they are of subspecies which have a much greater adult size.

As far as the other island populations are concerned, the Chatham Island population, which includes young specimens, was rediscovered several years ago on a remote part of the island, having previously been thought to be extinct. Now over 100 individuals have been marked. The Hood race is extremely rare, only seven individuals having been located (two males and five females). One male and three females have been transferred to a large enclosure near the Darwin Station, where mating takes place frequently. The latest word is that, during July this year, three nests were made, containing a total of 18 eggs, so it is possible that the Hood tortoise can yet be rescued from the very brink of extinction. Certainly there should be time to experiment with different breeding conditions, since the four Hood tortoises at the Station are all in their prime, judging by their well-marked growth rings, and since under the excellent conditions the Station provides, there has not yet been a single death among captive adults of any race.

The problematical Narborough Island tortoise has still not been seen since Beck's single specimen was collected in 1906. The island is free of human settlement and feral mammals, yet a party of highly experienced tortoise men were unable to find even traces of tortoises on Narborough in February this year, though John Hendrickson found a piece of tortoise dung and some cactus pads with tortoise-like bite marks in 1964. Narborough is a still-active volcano, and the area where Beck collected his tortoise is now covered with fresh lava. The general feeling is that there must be one or two left on Narborough somewhere, but no one seems able to find them.

The Abingdon Island tortoise has also eluded recent attempts to locate specimens, and it is possible that it is now extinct. Tortoises on this island were heavily collected by whalers, but no mammals were introduced until 1958, when a settler illegally brought in three goats. These have now increased to thousands, and are systematically clearing off the vegetation of the island. One theory is that the tortoises were forced to seek food in unaccustomed parts of the island and were all killed by falling into crevices. Certainly shells and bones apparently only a few years old may be seen in crevices on the island; but it would be sad indeed if the last individuals had already gone this way. The island is rarely visited, and one or two survivors may remain.

The tortoises of Barrington and Charles Islands were wiped out a long time ago. I do not believe that the population race attributed to Jervis Island has any real existence. The type of *Testudo wallacei* (the supposed Jervis race) is in fact of unknown origin, and the single tortoise definitely collected on Jervis (by Beck in 1905) had the appearance of an Albemarle tortoise, and had probably been introduced from that island by Georg Baur. Jervis is too small an island for a population of viable size to have eluded discovery.

As Herndon Dowling has mentioned, it is very sad that Miguel Castro found conditions too intolerable to continue his work in Galapagos. But it would be wrong to give the impression that conservation in the islands is not now in good hands. Two resident Ecuadorian National Park officials, Sr. Black and Sr. Villa, have been carrying out able and vigorous work on the tortoises of all the islands. The Duncan tortoise program continues, fertile eggs have now been collected on Chatham Island and brought to the station for incubation and raising of the young, and soon we may have the first hatchlings of *hoodensis*. Nests are being protected on James and Indefatigable, and predator control on South Albemarle is being carried out. Also, education of the local people into the significance of the Galapagos fauna is being undertaken; this is the only way to prevent recurrences of events such as the tragic introduction of goats to Abingdon only a few years ago. Galapagos conservation is now in the hands of a multi-national band of uncommonly tough and dedicated men - Black and Villa, mentioned above; Roger Perry, the Director of the Darwin Station; Tjitte DeVries, the resident ecologist; Daniel Weber, and Craig MacFarland, a graduate student from the United States who is doing an in-depth ecological study of the Indefatigable tortoises, with comparative observations on tortoises of all the other surviving populations. Moreover, the old problem of transportation should have been solved by the arrival of Beagle III, a boat fast enough to reach any point in the islands within twelve hours.



FIG. 3. Male Duncan tortoise, showing high, wide front of shell.

[It seems only appropriate to point out: 1) the forementioned tortoise colonies were all mapped and marked by Castro; 2) the two park rangers, though appointed by the Ecuadorian government, had their salaries paid by Lars-Eric Lindblad (Lindblad Travel); 3) Roger Perry is no longer director of the Darwin Station, and no new director was appointed for more than six months after he left; and 4) Beagle III still has not arrived (Beagle II sank in September, 1968). -- HGD]

ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be typewritten on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $16.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/4 inches (one column) or 9 3/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 13 1/2 inches). Line cuts are reduced 25 per cent in processing.

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.

UNREVIEWED-UNEDITED COMMUNICATIONS

"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

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CONTENTS

ARTICLES

4 HERPETOLOGISTS' LEAGUE MEETING IN CHICAGO, DECEMBER 1970.
The program and abstracts of papers are given here.

UNREVIEWED-UNEDITED COMMUNICATIONS

29 THE "QUADRIFURCATE" HEMIPENIS OF TROPIDOPHIS, by Frances W. Gibson. A four-lobed organ is confirmed in some members of this boid genus.

DEPARTMENTS

2 EDITORIAL

LETTERS TO THE EDITOR
3 Montanucci & Pisani on the Galapagos tortoises.

CONSERVATION NEWS
3 The New York "Mason Act" Confirmed.

BOOK REVIEWS
33 Duellman on Cochran & Goin's "Frogs of Colombia."
35 McDowell on a new manual of snake anatomy.

9 CURRENT HERPETOLOGICAL TITLES

HERPETOLOGISTS RECORD
8 Conant "Field Book" revision nears completion.

NEWS AND ANNOUNCEMENTS
31 Meetings and Societies.
Individuals and Institutions.
32 Research Grants.
East African Study Tour.

SOCIETY NOTES
2 The Society for the Study of Amphibians and Reptiles.
8 Members Desiderata: Means wants southeastern amphibians and reptiles.
8 Lost members.
36 Advice to Authors.

+ EDITOR Herndon G. Dowling
American Museum of Natural History
New York, New York 10024

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S S A R

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as THE OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, due largely to the originality and diversity of its publications program, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

Purpose. The SSAR encourages the acquisition of knowledge on amphibians and reptiles and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communication between amateur and professional herpetologists, so that they may work together in the common cause of furthering science.

Publications. The Society publishes the JOURNAL OF HERPETOLOGY, FACSIMILE REPRINTS IN HERPETOLOGY, and HERPETOLOGICAL REVIEW. Members receive all regular issues of these publications.

Membership & Subscriptions. Membership is open to anyone interested in amphibians and reptiles. Regular dues for 1971 are $8. in the United States and Canada, $6. in other countries; Sustaining dues are $10., Contributing $15., and Life $100. Subscriptions for institutions and individuals are $16. All inquiries about membership or subscriptions should be addressed to the Secretary.

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EDITORIAL

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As an indication of our interest in the field of herpetology, not merely of SSAR, we carry in this issue the program and abstracts of papers for the Chicago meeting of the HERPETOLOGISTS' LEAGUE. This is the first time that abstracts have been published for HL meetings.

Economic pressures as well as those of common interest are serving to emphasize the need of a single society of herpetology. Dues in both SSAR and HL will rise to $8. in 1971. Only by pooling their finances and memberships will such societies, with much the same interests, be able to survive. Thus, may we all hope that the proposed meeting of SSAR and HL boards of directors lead to an early move toward unification.

On another subject, HISS was selected as the depository for SSAR archives, with the expressed hope that it would become the depository for all herpetological societies and herpetologists. HISS will perform this responsibility to the limits of its facilities and storage. -- HGD.

****

NEW YORK'S "MASON ACT" UPHELD BY COURT

An act passed by the New York Legislature (Agriculture & Markets Law, Section 358-a, 3 February 1970) which prohibits the importation or sale of animals or their skins which are "deemed to be near extinction" has been validated by the State Court of Appeals (15 October 1970). Specifically included under the prohibition are "alligators, caimans, and crocodiles."

The law had been challenged by several shoe and leather-products companies on the basis that the state law included animals that were not considered endangered in the recently-enacted Federal "Endangered Species Act" (Public Law 91-135, 5 December 1969), and thus exceeded State authority. This contention was upheld by a lower court, but the Court of Appeals held that the Legislature had the right to extend coverage to any species which it considered to be subjects of exploitation, and thus threatened.

Both of these laws were preceded by the "Low Bill" (New York City Council No. 943-1124, 14 March 1969), which prohibited the sale of American alligator products in the City. Together, they appear to offer full protection to crocodilians in this state -- a major style, manufacturing, and sales center for "alligator" products. However, Paris, Rome, and Tokyo are also large producers of fine leather, and we must wait and see if they will prohibit crocodilian products before their sources disappear. If no steps are taken, it is likely that most crocodilian species will be extinct before the end of the decade. -- HGD.

NEW AFRICAN CONSERVATION CONVENTION

The new African Convention for Conservation of Nature and Natural Resources, signed in Algiers by 38 Heads of State or their representatives in September, 1968, is now in effect. Among the "totally protected" animals are two toads (Bufo superciliaris, Nectophrynoides), all marine turtles, the Giant, Angulated, and Radiated tortoises, the boas Bolyeria, Casarea, and Acranthophis, and two lizards, Uroplates and Macroscincus. Crocodiles also are "totally protected" but may be hunted under special permit in some countries. (Listings and a history of the Convention are given by Kai Curry-Lindahl in ORYX 10(2): 116.)

NEXT ISSUE

A report on the Galapagos tortoises by Peter C.H. Pritchard, who spent some weeks on the islands, will appear in the February issue of HERPETOLOGICAL REVIEW.

LETTERS

ON THE FUTURE OF THE GALAPAGOS TORTOISES. -- We have been very dismayed by a recent article in Herpetological Review (2(2): 3, 1970) pertaining to the plight of the Galapagos tortoises. It seems apparent to us that this is the last opportunity to initiate any sort of conservation effort to save these animals. It is most disturbing to note that no concerted conservation program is currently underway.

We are of the opinion that the Darwin Foundation conservation program does not (and probably never did) meet the minimum standards necessary for success, and that its shortcomings have been accentuated by Mr. Miguel Castro's leaving. The stakes are too high to expect one man or one organization to bear full administrative responsibility. We feel that the biota of the Galapagos is so unique and important that a joint conservation effort on the part of many organizations would be a minimal request. A trust fund could be established through the pooled allocation of funds by the National Science Foundation, World Wildlife Fund, National Wildlife Federation, the Audubon Society, International Turtle and Tortoise Society, Society for the Study of Amphibians and Reptiles, etc. The problem enters the domain of all the above, as what is really at stake here is an entire biota, not solely a herpetofauna.

The fund, supplemented by donations, could be established as an investment, the proceeds of which would go towards maintaining the Islands in cooperation with the Ecuadorian Government. To be effective, the program would have to consist of: 1- enough wardens to patrol shorelines (by outboard motor boat) and prevent fishermen from taking tortoises, ruining habitat, etc.; 2- systematic eradication of feral pigs, rats, goats and dogs; 3- propagation of tortoises by retrieving and hatching eggs in enclosures, along with restocking. This program is of such grand scale that we do not feel it to be within the funding capabilities of any one organization. Only in a joint program could the financial burden be met.

Time runs short, and the forces presently at work destroying the remaining tortoise populations will not stand in abeyance while we try to reach a decision as to what course of action should be taken. We recommend that the officers of major conservation groups communicate with each other and take immediate steps toward planning and initiating a suitable conservation program.

RICHARD R. MONTANUCCI & GEORGE R. PISANI
Museum of Natural History
UNIVERSITY OF KANSAS
Lawrence, Kansas 66044
/Received 26 October 1970./

HERPETOLOGISTS' LEAGUE

CHICAGO MEETING

HERPETOLOGICA: A RECORD

VOLUME NUMBER	ISSUES	YEARS	PAGES
1	8	1936-1940	211
2	7	1940-1945	212
3	6	1945-1947	224
4	6	1947-1948	228*
5	6	1949	152*
6	7	1950	202
7	4	1951	148
8	4	1952	183
9	4	1953	200
10	3	1954	200
11	3	1955	240
12	4	1956	328
13	4	1957-1958	280
14	4	1958	228
15	4	1959	240
16	4	1960	296
17	4	1961-1962	288
18	4	1962-1963	296
19	4	1963-1964	304
20	4	1964-1965	296
21	4	1965	320
22	4	1966	328
23	4	1967	332
24	4	1968	352
25	4	1969	330
26	4	1970	386+

*Plus supplements.

The HERPETOLOGISTS' LEAGUE is an international organization of professional and amateur herpetologists dedicated to furthering knowledge of the biology of amphibians and reptiles. It was established in 1936 by Major Chapman Grant. In 1969 it had 937 members and fellows, and 491 institutional subscriptions to its journal, HERPETOLOGICA, in the United States and 38 foreign countries.

Anyone with an interest in herpetology is eligible for membership. Members receive HERPETOLOGICA, to which they can submit manuscripts for publication, and may present papers at the annual meeting, which usually is held in conjunction with the AAAS meetings. However, the "Members" class does not hold voting rights in the League.

The business of the League is handled by the Officers, who are the President, Vice-President, Secretary-Treasurer, Editor-in-Chief, and the Executive Council. The Council is made up of the last three Presidents and six Fellows three of whom, are elected (biennially) for four-year terms. The Secretary-Treasurer and the Editor-in-Chief are appointed; other officers are elected by the Fellows.

The President of HL is Wilmer W. Tanner (Brigham Young U), the Vice-President is T. Paul Maslin (U Colorado), and the /acting/ Editor-in-Chief is Ronald Altig (Mississippi State U). Council members include K.S. Norris, P.W. Smith, J.M. Legler, J.R. Dixon, V.H. Hutchison, S.A. Minton, R.G. Zweifel, D.B. Wake, and C.J. McCoy.

The "Fellows" class holds voting rights in the League. Fellows are elected annually by the Executive Council "on the basis of their contribution to the science of herpetology," upon being nominated by a Fellow or an Honorary Member.

Like other societies, the HERPETOLOGISTS' LEAGUE has found it necessary to raise its dues recently. Dues and subscriptions for 1971 will be:

Members..... $8.00
Fellows..... 10.00
Institutions... 15.00

/The information presented above was abstracted from notices in HERPETOLOGICA, the League's Constitution, and recent information from the President and the Secretary-Treasurer./

28-29 DECEMBER

PROGRAM

Contributed Papers

Arranged by T. PAUL MASLIN
(Curator of Zoological Collections)
Univ. of Colorado Museum, Boulder, Colorado

****
MONDAY, DECEMBER 28 Conrad Hilton/Parlor 413
****

MORNING SESSION. Chairman: T. PAUL MASLIN

10:00 FOOD ECOLOGY OF A TROPICAL FROG, LEPTODACTYLUS FALLAX. Garnett R. Brooks (College of William and Mary)

10:20 SUMMER FOOD HABITS OF RANA SEPTENTRIONALIS AND SYMPATRIC RANA PIPIENS IN MINNESOTA. Stanley E. Hedeen (Xavier University)

10:40 THE DAILY ACTIVITY AND ECOLOGY OF CALLISAURUS AT THE NEVADA TEST SITE. Wilmer W. Tanner (Brigham Young University)

11:00 AMPHIBIANS, REPTILES AND FUNGUS OF THE GENUS BASIDIOBOLUS. Max A. Nickerson and James A. Hutchison (Arkansas State University)

11:15 PRECISION OF BEHAVIORAL THERMOREGULATION IN LIZARDS. Bayard H. Brattstrom (California State College, Fullerton)

11:35 COMPARATIVE TONGUE HISTOLOGY OF THE LIZARDS CNEMIDOPHORUS TIGRIS (TEIIDAE) AND SCELOPORUS JARROVI (IGUANIDAE). Stephen R. Goldberg (Whittier College)

11:55 COMPARATIVE HEMATOLOGY OF SOME NEOTROPICAL FROGS. Duvall A. Jones (Carnegie-Mellon University)

****

AFTERNOON SESSION. Chairman: HYMEN MARX (Field Museum of Natural History)

2:00 MORPHOLOGY AND PHYLOGENETIC RELATION OF THE VIPERID SNAKE, AZEMIOPS FEAE. Karel Liem, Hymen Marx and George Rabb (Field Museum of Natural History and Chicago Zoological Park)

2:20 MOVEMENTS OF THE BOX TURTLE, TERRAPENE CAROLINA. Robert Madden (Queens College)

AFTERNOON SESSION (CONTINUED).

2:40 THE PHYLOGENETIC IMPLICATIONS OF BODY MOVEMENTS IN DISPLAYING SCELOPERINE LIZARDS. James R. Purdue and Charles C. Carpenter (University of Oklahoma)

3:00 HOME RANGE OF SCELOPORUS UNDULATUS ERYTHROCHEILUS MASLIN. John W. Ferner (University of Colorado)

3:20 HEARTRATE AND AGGRESSION IN AMPHIBOLURUS BARBATUS. Jan F. Sassaman and Charles C. Carpenter (University of Oklahoma)

3:35 PREDATION RESPONSE OF THE PANCAKE TORTOISE MALACOCHERSUS TORNIERI. L. C. Ireland (State University of New York, Buffalo)

3:55 AGGRESSIVE DISPLAYS IN THE VARIABILIS GROUP OF SCELOPORUS (IGUANIDAE). Charles C. Carpenter (University of Oklahoma)

4:15 SEA SNAKE COLLECTION AND VENOMS. Anthony T. Tu (Colorado State University)

****
TUESDAY, DECEMBER 29 Conrad Hilton/Parlor 413
****

MORNING SESSION. Chairman: WILMER W. TANNER (Brigham Young University)

9:30 BODY SIZE AND DISTRIBUTION OF WHIPTAIL LIZARDS. Kenneth K. Asplund (Virginia Commonwealth University)

9:50 REPRODUCTION IN THE CANEBRAKE RATTLESNAKE, CROTALUS HORRIDUS. J. Whitfield Gibbons (Savannah River Ecology Laboratory)

10:10 MICROGEOGRAPHIC VARIATION IN DESMOGNATHUS FUSCUS. George W. Folkerts (Auburn University)

10:30 A POPULATION OF OZARK HELLBENDERS. Max A. Nickerson and Charles E. Mays (Arkansas State University)

10:50 A NEW LIMBLESS SKINK FROM THAILAND WITH COMMENTS ON THE GENERIC STATUS OF THE LIMBLESS SKINKS OF SOUTHEAST ASIA. W. Ronald Heyer (Pacific Lutheran University)

11:10 LIFE HISTORY AND POPULATION STRUCTURE OF DESMOGNATHUS OCHROPHAEUS INHABITING WET ROCK FACES. Stephen G. Tilley (Smith College)

11:30 BUSINESS MEETING Conr.Hilt./Parl.413
****

ABSTRACTS OF PAPERS

ASPLUND, KENNETH K. (Va. Comm. U.). Body size and distribution of whiptail lizards.

Among bisexual species of Cnemidophorus (Teiidae) in the arid southwest, the largest forms are generally restricted to the shadiest habitats. Small body size has apparently evolved in response to the development of desert scrub in the late Pleistocene. During above-ground activity periods, larger whiptails spend more time in shaded microhabitats and less time basking than do smaller whiptails. Both sizes have similar daily activity patterns. Eccritic body temperatures and thermal tolerance limits are similar in both size classes. The observed differences in behavior are presumably due to a relatively greater thermal lag and a more effective muscular thermogenesis in the larger lizards.

BRATTSTROM, BAYARD H. (Calif. State Coll.). Precision of behavioral thermoregulation in lizards.

Several recent experiments have indicated the importance of learned behavior in determining the precision with which such lizards as Sceloporus magister and Dipsosaurus dorsalis can behaviorally thermoregulate. In one hour (only) daily exposure to a photothermal gradient, the lizards become more effective in learning to use the thermal mosaic of the gradient. As a result the variation in body temperature is less on each subsequent day. In Sceloporus magister the preferred body temperature also drops on each subsequent day. The size, shape, and thermal parameters of thermal gradients will be discussed in light of these and other experiments.

BROOKS, GARNETT B. (Coll. William & Mary). Food ecology of a tropical frog, Leptodactylus fallax.

(abstract not received)

CARPENTER, CHARLES C. (U Oklahoma). Aggressive displays in the variabilis group of Sceloporus (Iguanidae).

(abstract not received)

FERNER, JOHN W. (U. Colo.). Home range of Sceloporus undulatus erythrocheiles Maslin.

This is a rock inhabiting lizard of the eastern Colorado foothills. An ecological study of one population of this lizard has continued in Boulder County, Colorado since 1969. Individuals were captured, marked, released and reobserved within the 3/4 acre study area. Ninety-seven lizards (53 males and 44 females) have been captured, 32 males and 19 females being observed at least three times in any one year. The home range size of these lizards was calculated with a polygon method and a minimum of ten observations was used to give a reliable calculation. On the basis of ten or more observations, resident adults (over 50 mm snout-vent length) had an average home range size of 0.08 acres for 10 males and 0.03 acres for 9 females. The large degree of male home range overlap suggests that home range is not equal to territory in these lizards. A promiscuous mating system is implied from the overlap of male and female home ranges and from behavioral notes.

FOLKERTS, GEORGE W. (Auburn U.). Microgeographic variation in Desmognathus fuscus.

An analysis of geographic variation in pattern characteristics of populations of the ravine ecotype of Desmognathus fuscus in the mid-South revealed the presence of microgeographic races which in some instances are remarkably distinct from one another. Other characters analyzed did not necessarily vary geographically in a pattern concordant with those demonstrated by pattern and pigmentation. The ranges of the microgeographic races partially coincide with the boundaries of physiographic or biotic regions. Similarities and dissimilarities among the populations can be correllated with conjectured past dispersal pathways. Some workers have looked at these populations from a purely phenetic viewpoint and considered them to be species or subspecies, an approach which creates additional obfuscation of relationships in a genus where confusion is already rampant.

GIBBONS, JAMES W. (Savannah River Ecol. Lab.). Reproduction in the canebrake rattlesnake, Crotalus horridus.

Mean litter size of the canebrake rattlesnake in South Carolina is 12.5 and does not increase as a function of female body size. Follicular atresia occurs and is possibly a mechanism whereby litter size is optimized in accord with environmental conditions. A biennial, or possibly triennial, reproductive cycle occurs in female canebrake rattlesnakes in this region. Size of the fat bodies seems related to reproductive state of the individual. Amount of fat increases during the first summer of yolking but is significantly reduced in females containing embryos the following spring. Immediately after parturition in late summer the fat stores are extremely diminished. Canebrakes are over 100 cm in snout-vent length and weigh over 700 g when mature. They presumably have their first litter in late summer four years after birth. Males are mature at 90-100 cm in length and are reproductively active in their fourth year. Size superiority in combat dances may be the positive factor that has favored selection for larger individuals of this sex.

GOLDBERG, STEPHEN R. (Whittier Coll.). Comparative tongue histology of the lizards Cnemidophorus tigris (Teiidae) and Sceloporus jarrovi (Iguanidae).

The distally forked tongue of Cnemidophorus tigris is abundantly supplied with nerves and sensory fibers. It contains papillae of the filiform variety which are covered by stratified squamous epithelium. Mucous cells are present in the crypts between the posterior papillae. Sceloporus jarrovi possesses an unforked tongue containing villus-like papillae. The heads of the papillae are capped by squamous cells; the shaft is covered by columnar epithelium. No sensory fibers were seen. Moderate quantities of mucous glands are found in the squamous epithelium which covers the posterior portions of the tongue. Differences were noted in taste corpuscle morphology. In C. tigris they are round, whereas those of S. jarrovi are flask shaped. Both contain sensory and supportive cells. Sensory cells of S. jarrovi end in peg-like processes. Those present in C. tigris lack these processes.

HEDEEN, STANLEY E. (Xavier U.). Summer food habits of Rana septentrionalis and sympatric Rana pipiens in Minnesota.

Stomach content analysis revealed animal material in all 74 R. septentrionalis examined. Plant material occurred in 67 stomachs. Diet differences among mink frog populations in Itasca State Park were due to differences in habitat and seasonal food availability. R. pipiens joined resident R. septentrionalis in aquatic habitats during August. In Bog D, mink frogs located within 10 feet of shore primarily ingested aquatic prey while sympatric leopard frogs primarily ingested terrestrial prey. In Lake Itasca, mink and leopard frogs located more than 10 feet from shore contained similar numbers of all major food items except Coleoptera larvae and Trichoptera adults. Higher incidence of these aquatic prey in R. septentrionalis may reflect interspecific differences in feeding behavior. The water surface foraging behavior of R. septentrionalis, a very aquatic species, is probably more efficient than that of R. pipiens, a semi-aquatic species with a wide habitat range.

HEYER, W. RONALD (Pacific Lutheran U.). A new limbless skink from Thailand with comments on the generic status of the limbless skinks of Southeast Asia.

Three limbless skinks have been known previously from Thailand. Discovery of a new species of limbless skink in Thailand initiated a review of the limbless skinks of the region. Based on characters of skeletal and external morphology, the conclusion is reached that each of the Thai limbless skinks represents an independent invasion of the fossorial habitat. Furthermore, the Thai forms represent distinct evolutionary lineages from the Australian limbless skinks which previous workers have placed in a common genus.

IRELAND, LEONARD C. (S.U.N.Y. at Buffalo). Predation response of the pancake tortoise Malacochersus tornieri.

Early field observers reported that the soft-shelled, East African tortoise Malacochersus tornieri wedged itself into narrow rock crevices, presumably to escape predators,

by inflating its body with air and using its legs as struts. In the present experiment 6 Malacochersus had their lungs catheterized to permit direct recording of intrapulmonary pressure and were equipped with chronic electrodes to permit the recording of heart rate and various muscular activities. These parameters were recorded while the animal was pulled from an artificial crevice. The subjects' behavior was simultaneously recorded on 16mm. film and video tape. While being pulled from the crevice all subjects were observed to dig the claws of their forelimbs into the ground and rotate their forelimbs outward, wedging the body into place. At such instances a decrease in pulmonary pressure was often noted, reflecting the extent to which the position of the pectoral girdles changed relative to the internal space of the shell. Never in over 100 trials was a significant and sustained increase in pulmonary pressure associated with the wedging action. These observations suggest a different interpretation of the significance of the soft-shell of Malacochersus.

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JONES, DUVALL A. (Carnegie-Mellon U.). Comparative hematology of some Neotropical frogs.

Erythrocyte count and size, hematocrit, and hemoglobin concentrations are given for twenty-four species of Neotropical frogs in five families. Erythrocyte counts and hemoglobin concentrations for some of these tropical species exceed those reported for frogs of temperate North America. There does not appear to be a correlation between any of these measurements and the accumulation of biliverdin in the tissues.

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LIEM, KAREL, HYMEN MARX and GEORGE B. RABB (Field Museum of Natural History and Chicago Zool. Park). Morphology and phylogenetic relations of the viperid snake, Azemiops feae.

Azemiops is a primitive viperid, as shown by the small proportion (18%) of 50 skeletal and integumental characters occurring in a derived state. In several features reputedly separating the crotalines and viperines, Azemiops shows intermediate conditions or shares a state with one group. Azemiops also exhibits four substantial characteristics unique among the Viperidae. Separate subfamily ranking best indicates our assessment of its phylogenetic relationships.

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MADDEN, ROBERT (Queens Coll.). Movements of the box turtle, Terrapene carolina.

(abstract not received)

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NICKERSON, MAX A. and JAMES A. HUTCHISON (Ark. St. U.). Amphibians, reptiles and fungus of the genus Basidiobolus.

More than 400 specimens of amphibians and reptiles, representing 53 taxa and a variety of ecological relationships, were surveyed for the fungus, Basidiobolus ranarum. B. ranarum was isolated from species occupying a broad range of ecological situations, varying from totally aquatic to semi-arboreal and subterranean forms. B. ranarum has been described as an etiological agent in salamanders but appears a common saprobe in many amphibians and reptiles.

****

NICKERSON, MAX A. (Ark. St. U.) and CHARLES E. MAYS (DePauw U.). A population of Ozark hellbenders.

During the summers of 1969 and 1970 a population of the Ozark hellbender was studied using scuba gear and tag recapture methods. Data presented include estimates of their numbers, biomass, density, and various aspects of natural history.

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PURDUE, JAMES R. and CHARLES C. CARPENTER (U. Okla.). The phylogenetic implications of body movements in displaying Sceloperine lizards.

Body motion of displaying males was quantified by calculating two ratios representing shoulder and hip movement for each push-up. Within the Uta/Urosaurus complex two distinct groups were revealed. Species of Urosaurus formed one group by displaying with considerable hip motion; species of Uta (sensu Mittleman) formed the second group by displaying with little hip motion. Collectively these two genera greatly exceeded the range of comparable values for more than 20 species of Sceloporus. These data supported the division of Uta and Urosaurus. Present data further indicated much similarity in the display between the merriami and maculosus groups of Sceloporus and Urosaurus, supporting the view that Urosaurus stemmed from this branch of Sceloporus. A similar situation was noted between the Sceloporus variabilis group and Uta. The form mearnsi had much display motion similarity with species of Uta.

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SASSAMAN, JAN P. and CHARLES C. CARPENTER (U Oklahoma). Heartrate and aggression in Amphibolurus barbatus.

(abstract not received)

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TANNER, WILMER W. (Brigham Young U). The daily activity and ecology of Callisaurus at the Nevada test site.

(abstract not received)

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TILLEY, STEPHEN G. (Smith Coll.). Life history and population structure of Desmognathus ochrophaeus inhabiting wet rock faces.

Populations of the salamander Desmognathus ochrophaeus inhabiting wet, vertical rock faces in the vicinity of Mt. Mitchell, North Carolina were sampled and information on size and age at maturity was compiled. Size at maturity was found to increase with increasing elevation and at a given elevation individuals were found to mature at smaller body sizes than they do in nearby woodland populations. Two populations inhabiting rock faces at 5025 and 3500 feet above sea level yielded sample sizes sufficient to permit determination of age at maturity and juvenile growth rates from juvenile size-frequency distributions. In the higher elevation population sexual maturity is attained at larger body sizes, which in turn are attained by delaying sexual maturity about one year relative to its occurrence in the lower population. The juvenile growth rates of the two populations are similar to one another and to those estimated for nearby woodland populations.

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TU, ANTHONY T. (Colo. St. U.). Sea snake (Hydrophiidae) collection and venoms.

In total, 2,600 and 6,000 sea snakes were collected in 1967 and 1969 respectively, in the different parts of Southeast Asia. In 1969, we collected 4,305 Lapemis hardwickii among the 5,306 sea snakes captured in the Gulf of Thailand. The predominant sea snake inside the caves of Gato Island was Laticauda semifasciata with a smaller number of Laticauda colubrina. The majority of sea snakes collected in Amami Island were Laticauda semifasciata, but were much smaller in size and length from those of Gato Island. Pelamis platurus is quite common along the Northern Formosan coast while Hydrophis cyanocinctus is quite common along the south-western Formosan Coast. Most of the sea snakes in Hong Kong waters are of the genus Hydrophis. The toxic components of venoms were isolated from E. schistosa, L. hardwickii, and L. semifasciata. They have a molecular weight of about 7,000 with 61 or 62 amino acid residues, and an isoelectric point of 9.2 to 9.9. The fact that the purified toxins are devoid of enzymatic activity suggests that toxins are non-enzymatic in nature. The tryptophan residue is necessary for the toxic action of sea snake venom as the chemical modification of tryptophan residue of purified toxin completely destroyed toxic action.



ANNOUNCEMENT

The Society for the Study of Amphibians and Reptiles is pleased to announce the new Editorial Committee for its Miscellaneous Publications series (which includes the Facsimile Reprints in Herpetology program). The committee will serve for one year beginning January 1, 1971.

Miscellaneous Publications:
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University of Texas at El Paso

The Society wishes also to publicly record its gratitude to Carl Gans and I. S. Darevsky for their service on this committee during 1969 and 1970.

MEMBERS DESIDERATA

D. BRUCE MEANS (Tall Timbers Research Station, Route 1, Box 160, Tallahassee, Fla. 32301) would like to obtain data from independent collectors on reptiles and amphibians from western Florida, southern Alabama and southern Georgia. These data are needed in the compilation of distribution maps for herps from this area. A study will be terminated with the publication of an annotated checklist of the reptiles and amphibians of the Tall Timbers region.

LOST MEMBERS

Mail addressed to the following members or "Catalogue" subscribers has been returned, marked "Address Unknown." Information on current addresses should be forwarded to the Editor.

VICTOR L. CAMP, 207 West Cherry Street, Carbondale, Ill. 62901.

DOUGLAS M. LAY, 1369 E. Hyde Park, Apt. 908, Chicago, Ill. 60615.

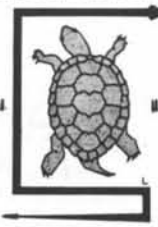
M. B. MITTLEMAN, 3730 Lake Shore Drive, Chicago, Ill. 60613.

FIELD GUIDE NEARING COMPLETION

Work on the final phases of the second and completely revised edition of the Conant Field Guide (Houghton Mifflin) is now well advanced. The new book, which will bear the title of A Field Guide to the Reptiles and Amphibians of Eastern and Central North America, will include all the species and subspecies occurring in western Texas and northward that currently are not covered in either the Stebbins or the Conant Guides.

Roger Conant expects to spend a large part of 1971 preparing distribution maps, and he requests that information about range extensions or pending taxonomic changes be sent to him as soon as possible. Publication of his Field Guide is expected in late 1972 or early in 1973, but the manuscript, maps, and art work must all be submitted to the publisher a full year in advance. Address him as follows:

ROGER CONANT
Hyla Holler, Taunton Lakes
Marlton, New Jersey 08053



CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

The CATALOGUE has published its 100th account -- along with a Table of Contents and a new title page. The last issue consists of:

91. ***Plethodon vandykei***, by Edmund D. Brodie, Jr. and Robert M. Storm.
92. ***Hyla septentrionalis***, by William E. Duellman and Ronald I. Crombie.
93. ***Bufo alvarius***, by M. J. Fouquette, Jr.
94. ***Bufo valliceps***, by Kenneth R. Porter.
95. ***Coleonyx***, by James R. Dixon.
96. ***Coleonyx variegatus***, by James R. Dixon.
97. ***Gerrhonotus kingii***, by Robert G. Webb.
98. ***Thamnophis proximus***, by Douglas A. Rossman.
99. ***Thamnophis sauritus***, by Douglas A. Rossman.
100. ***Clemmys marmorata***, by R. Bruce Bury.

The first issue for 1971 will include Cryptobranchus, two Plethodon accounts, two frog accounts, two turtle accounts, and Anolis distichus.

For prices and additional information, write:

Herpetological Catalogue Committee
Department HR4
American Museum of Natural History
New York, N.Y. 10024

CURRENT HERPETOLOGICAL TITLES, XII: 1969 - 1970

Herpetological Information Search Systems
American Museum of Natural History
New York, N. Y. 10024

In the last twelve issues we brought to your attention some 11,500 current titles in the pages of this journal. This list brings the titles of papers published in 1969 to a new high for one year, 3,950 and still more to go.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts-Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses especially.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any current paper (e.g., 1969-1970) that is concerned with a member of a Recent order of amphibians or reptiles.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This twelfth list contains titles of books and articles that have come to our attention during the period 21 July 1970 through 7 October 1970. The list is divided into two separate, alphabetically arranged sections: one for titles published in 1969, and one for titles published in 1970.

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and T. Shaman. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. Dr. Robert W. Winter provided us with translations of titles, abstracts and papers from Slavic languages. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need, however, and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 26 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

HERPETOLOGICAL
INFORMATION
SEARCH
SYSTEMS



IF YOUR MAILING ADDRESS
HAS BEEN CHANGED.....

...It may be because HISS is handling the SSAR mailing list now. As a part of our continuing effort to gather information needed by people who are interested in amphibians and reptiles, HISS has begun preparation of a comprehensive world list of herpetologists.

As an initial step, we have consolidated the mailing lists of the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES and the CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES. Other names are being added as time permits.

HERPETOLOGICAL
INFORMATION
SEARCH
SYSTEMS



--1969--

- A -

ABRAMS,GERALD D.
1969. Diseases in an amphibian colony.
RECENT RESULT CANCER RES (spec suppl):419-428, 20 fig.

ANON
1969. Asklepios: a myth to remember.
MED J AUST 1(4):169-170.

ANON
1969. /Forty-seventh (1967-68) annual report of the Wildlife Preservation Society of Australia: Sea turtles asd Freshwater crocodiles/.
AUST WILD LIFE 5(4):11.

ANON
1969. Ride on a turtle saves seaman.
DAILY EXPRESS (LONDON) 25 August 1969:1.

ANON
1969. Salamanders adapting to extra legs.
SCI NEWS 95(23):551.

ANON
1969. The tiger salamander.
NAHO 2(3):9-11, illus.

ANON
1969. Tortoises, terrapins, and turtles.
BRIT MED J (5686):758-759.

ANON
1969. Zoology Department.
MANCHESTER MUS REP 1968-1969:7-12.

ARVY,LUCIE
1969. Contribution a l'etude du rein des reptiles: donnees histoenzymologiques sur le rein des colubrides.
ACTA ANAT 73(1)=(suppl 56):27-39, 12 fig., 3 tab.

- B -

BAGNARA,JOSEPH T., MAC E.HADLEY and JOHN D.TAYLOR
1969. Regulation of bright-colored pigmentation of amphibians.
GEN COMP ENDOCRINOL (SUPPL) 2:425-438, 13 fig.

BALLS,MICHAEL, JOHN D.SIMNETT and ELIZABETH ARTHUR
1969. Organ cultures of normal and neoplastic amphibian tissues.
RECENT RESULT CANCER RES (spec suppl):385-398, 12 fig., 4 tab.

BANNER,ALBERT H.
1969. (Letter to J.R. Hendrickson on toxicity in turtle flesh.)
IUCN PUBL (N.S.) 20:88.

BASU,S.L.
1969. Effect of hormones on the Salientian spermatogenesis in vivo and in vitro.
GEN COMP ENDOCRINOL (SUPPL) 2:203-213, 2 fig., 2 tab.

BECHT,G.
1969. Seasonal changes in the contents of inorganic ions in the blood of Rana esculenta.
NETH J ZOOL 19(4):610-620, 3 fig., 2 tab.

BIANCHI,M., G.TORELLI, F.CELENTANO and G.CORTILI
1969. Misure della corrente di "corto circuito" su pelle di Rana in situ.
BOLL SOC ITAL BIOL SPER 45(7):385-388, 3 fig.

BLANC,CHARLES P.
1969. Etudes sur les iguanidae de Madagascar. IV.- Morphologie de l'ovaire de Chalarodon madagascariensis Peters, 1854.
BULL SOC ZOOL FR 94(4):631-640, 2 fig., 2 tab.

BOONSTRA,L.D.
1969. The fauna of the Tapinocephalus zone (Beaufort beds of the Karoo).
ANN S AFR MUS 56(1):1-73, 22 fig., 1 tab.

BRUNST,VICTOR V.
1969. Structures of spontaneous and transplanted tumors in the Axolotl (Siredon mexicanum).
RECENT RESULT CANCER RES (spec suppl):215-219, 11 fig.

BURMESTER,B.R., R.L.WITTER, K.NAZERIAN and H.G.PURCHASE
1969. A herpes virus as a cause of Marek's disease in chickens.
RECENT RESULT CANCER RES (spec suppl):460-468, 6 fig.

BURTON,MAURICE
1969. Animal partnerships. Frederick Warne and Co., Inc., New York. 107 p., illus.

BYRD,FRANKLIN E. and BOB D.JOHNSON
1969. Hemolysis by Crotalus horridus atricaudatus venom.
PROC ARKANSAS ACAD SCI 23:105-109, 2 fig.

- C -

CAMPBELL,C.H.
1969. Fatal case of mulga (Pseudechis australis) snakebite.
MED J AUSTRAL 1(8):426.

CARR,ARCHIE
1969. Sea turtle resources of the Caribbean and Gulf of Mexico.
FAO FISH REP (71.1):160-161. (abstr)

CARROLL,ROBERT L.
1969. Origin of reptiles, p. 1-44, 14 fig., In, Carl Gans, Angus D'A.Bellairs and Thomas S.Parsons (Eds.) Biology of the Reptilia, vol. 1, Morphology A. Academic Press, N.Y.

CHEPURNOVA,N.E., S.A.CHEPURNOV, I.B.LAPRUN and V.YU.SHCHEBLANOV
1969. Efferent sympathetic activity derived from mixed frog nerve in immediate postirradiation period.
DOKL AKAD NAUK SSSR BIOL SCI SECT (TRANSL) 185(1-6):313-316, 3 fig.

CHUGUNOV,YU.D. and K.A.KISPOEV
1969. Daily rhythm of gas metabolism and the pineal eye in Rana temporaria L.
DOKL AKAD NAUK SSSR BIOL SCI SECT (TRANSL) 187(1-6):596-597.

CLAIRAMBAULT,PIERRE and ERNESTO CAPANNA
1969. Osservazioni sull'Istologia del Nucleo mediale del setto in differenti Anfibi anuri.
ATTI ACCAD NAZ LINCEI REND SER 8 47(1-2):126-130, 1 fig., 3 pl.

CLARK,H.FRED, CLAUDIA GRAY, FRANCES FABIAN, ROBERT F.ZEIGEL and DAVID T.KARZON
1969. Comparative studies of amphibian cytoplasmic virus strains isolated from the leopard frog, bullfrog, and newt.
RECENT RESULT CANCER RES (spec suppl):310-326, 9 fig., 4 tab.

COHEN,NICHOLAS
1969. Immunogenetic and developmental aspects of tissue transplantation immunity in urodele amphibians.
RECENT RESULT CANCER RES (spec suppl):153-168, 7 fig., 3 tab.

COLLINS,RICHARD F.
1969. The helminths of Natrix spp. and Agkistrodon piscivorus piscivorus (Reptilia: Ophidia) in Eastern North Carolina.
J ELISHA MITCHELL SCI SOC 85(4):141-144, 2 tab.

CONNOLLY,CHARLENE and NAN ECKERT
1969. The archaeological significance of the desert tortoise.
NEV STATE MUS ANTHROPOL PAP (14) misc pap (4):80-93, 1 fig., 6 tab.

COOPER,EDWIN
1969. Immunity and tolerance in amphibia.
RECENT RESULT CANCER RES (spec suppl):130-136, 2 fig.

CRUIKSHANK,A.R.I.
1969. (REVIEW OF) Biology of the Reptilia, vol. 1, Morphology A. by Carl Gans, Angus D'A. Bellairs and Thomas S. Parsons (Eds.), 1969.
S AFR J SCI 65(10):301-302.

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DABAGYAN,N.V., R.O.OGANESYAN and V.V.POPOV
1969. Restoration of function in the regenerating retina of tailless amphibian larvae.
DOKL AKAD NAUK SSSR BIOL SCI SECT (TRANSL) 185(1-6):257-261, 3 fig., 1 tab.

DAREVSKII,I.S. and F.D.DANIELYAN
1969. Diploid and triploid individuals in the offspring of parthenogenetic females of rock lizards naturally mating with males of close bisexual species.
DOKL AKAD NAUK SSSR BIOL SCI SECT (TRANSL) 184(1-6):197-199, 3 tab.

DARINSKII,YU.A.
1969. Influence of duration of stimulation of a dorsal root on rate of reflex-reaction restoration.
DOKL AKAD NAUK SSSR BIOL SCI SECT (TRANSL) 184(1-6):133-135, 2 fig.

DAVIS,LEO CARSON
1969. The biostratigraphy of Peccary Cave Newton County, Arkansas.
PROC ARKANSAS ACAD SCI 23:192-196, 1 fig.

DAVITASHVILI,L.SH.
1969. Prichiny vymirania organizmov. (Causes of extinction of organism). Nauka, Moskwa. 440 p., 28 fig., 2 tab.

DAWE,CLYDE J.,JR.
1969. Some comparative morphological aspects of renal neoplasms in Rana pipiens and of lymphosarcomas in amphibia.
RECENT RESULT CANCER RES (spec suppl):429-440, 9 fig.

DELANNEY,LOUIS E. and KATE BLACKLER
1969. Acceptance and regression of a strain-specific lymphosarcoma in Mexican Axolotls.
RECENT RESULT CANCER RES (spec suppl):399-408, 1 fig., 3 tab., 1 pl.

DIBERARDINO,MARIE A. and NANCY HOFFNER
1969. Chromosome studies of primary renal carcinoma from Vermont Rana pipiens.
RECENT RESULT CANCER RES (spec suppl):261-278, 8 fig., 2 tab.

DURYEE,WILLIAM R.
1969. Dependence of tumor formation in frogs on abnormal nucleolar function.
RECENT RESULT CANCER RES (spec suppl):82-100, 12 fig., 2 tab.

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EATON,J.E.,JR. and E.FRIEDEN
1969. Primary mechanisms of thyroid hormone control of amphibian metamorphosis.
GEN COMP ENDOCRINOL (SUPPL) 2:398-407, 8 fig., 1 tab.

EISELT,JOSEF
1969. (REVIEW OF) Liste de Rezenten Amphibien und Reptilien. Cordylidae (Cordylinae + Gerrhosaurinae), by Heinz Wermuth, 1968.
ANN NATURHIST MUS WEIN 73:449.

EISELT,JOSEF
1969. Zweiter Beitrag zur Taxonomie der Zagros-Eidechse, Lacerta princeps Blanford.
ANN NATURHIST MUS WEIN 78:209-220, 4 tab., 1 col. pl.

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1969. Die Fauna der miozaenen Spaltenfuellung von Neudorf an der March (CSSR) Reptilia (Lacertilia).
SITZ OESTERR AKAD WISS MATH NATUR KL ABT I 178(1-4): 77-82, 2 pl. (Engl summ)

ETHERIDGE,RICHARD
1969. A review of the iguanid lizard genus Enyalius.
BULL BRIT MUS (NATUR HIST) ZOOL 18(8):231-260, 11 fig., 2 tab.

ETKIN,WILLIAM, ALBERT DERBY and AMOS G.GONA
1969. Prolactin-like antithyroid action of pituitary grafts in tadpoles.
GEN COMP ENDOCRINOL (SUPPL) 2:253-259, 4 fig.

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FAVARD,PIERRE and COLETTE FAVARD-SERENO
1969. Electron microscope study of polysaccharides in the amphibian oocytes.
J SUBMICROSC CYTOL 1(2):91-111, 21 fig.

FELDMANN,REINER
1969. Nachweise des Kammolches im suedlichen Westfalen.
NATUR HEIMAT 29(4):113-117, 2 fig.

FERGUSON,DENZEL E.
1969. The compatible existence of non-target species to pesticides.
BULL ENTOMOL SOC AMER 15(4):363-366.

FAO. FISHERY RESOURCES AND EXPLOITATION DIVISION. MARINE BIOLOGY AND ENVIRONMENT BRANCH (ED.)
1969. Symposium on investigations and resources of the Caribbean Sea and adjacent regions preparatory to the Cooperative Investigation in the Caribbean and adjacent regions (CICAR) organized through the joint efforts of FAO and UNESCO, Willemstad, Curacao, Netherlands Antilles, 18-26 Nov. 1968. Rept. and abstrs. of papers.
FAO FISH REP (71.1):1-165.

FINK,MARY A., GLADYS KING and MERLE MIZELL
1969. Reactivity of serum from frogs and other species with a herpesvirus antigen extracted from a burkitt lymphoma cultured cell line.
RECENT RESULT CANCER RES (spec suppl):358-364, 1 fig., 3 tab.

FREED,JEROME J., LISELOTTE MEZGER-FREED and SUSAN A.SCHATZ
1969. Characteristics of cell lines from haploid and diploid Anuran embryos.
RECENT RESULT CANCER RES (spec suppl):101-111, 17 fig.

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GALLIEN,LOUIS
1969. Spontaneous and experimental mutations in the newt Pleurodeles waltlii Michah.
RECENT RESULT CANCER RES (spec suppl):35-42, 7 fig.

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ACTA ANAT 73(1) (4)
ACTA PHYSIOL LATINOAMER 20(1)
AFRICANA 4(1)
ALA BIRDLIFE 17(1)
AMER J ANAT 128(2)
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AMER NATUR 104(936)
AMER PHIL SOC YEARBOOK 1969
AMER ZOOL 10(2)
AMERICAS 22(7)
AN ESC NAC CIENC BIOL MEX 17(1-4)
ANAT ANZ 126(4)
ANAT REC 167(4)
ANCHOR 3(8), 4(5) (8)
ANIM BEHAV 18(1)
ANIM KINGDOM 73(3)
ANKUS 2(6-7)
ANN S AFR MUS 56(1)
ANNEE BIOL SER 4 9(5-6)
ANNU REP PORT ELIZABETH MUS 1969
ANNU REP WEST AUST MUS 1968-69
ANTARCTIC J U S 5(3) (4)
AQUA TERRA 7(7)
AQUAR 41(1) (2)
AQUAR MAG 4(6) (7)
AQUAR TERR 17(4) (5) (6)
AQUARIEN TERRARIEN Z 23(6) (7) (8)
ARCH BIOCHEM BIOPHYS 139(2)
ARCH BIOL (LIEGE) 81(1)
ARCH INT PHYSIOL BIOCHIM 78(1) (2)
ATTI ACCAD NAZ LINCEI REND SER 8 47(1-2)
AUST WILD LIFE 5(4)
BETES NATURE (77)
BIOCHEMISTRY 9(13)
BIOCHIM BIOPHYS ACTA 193, 206(3), 211(1), 215(1)
BIOFIZIKA 14(1)
BIOL GABONICA 5(4)
BIOL GALLO-HELLEN 2(2)
BIOL REPROD suppl 2
BIOPHYS J 10(7)
BIOS 41(1)
BLIJDORP GELUIDEN 18(6-7)
BOLL SOC ITAL BIOL SPER 45(7), 46(1)(2)(4)
BRAIN BEHAV EVOL 2(3)
BRAIN RES 20(3)
BREVIORA (353)
BRIGHAM YOUNG UNIV SCI BULL (BIOL SER) 11(1)
BRIT MED J (5686)
BULL BRIT MUS (NATUR HIST) ZOOL 18(8), 19(7)
BULL ENTOMOL SOC AMER 15(4)
BULL FAC SCI CAIRO UNIV (42)
BULL MD HERPETOL SOC 6(2)
BULL MUS COMP ZOOL HARVARD UNIV 140(1)
BULL MUS NAT HIST NATUR PARIS SER 2 41(5)
BULL MUS PICT GALL BARODA 21
BULL SMITHSONIAN INST (228)
BULL SOC ZOOL FR 94(4)
C R ACAD SCI (PARIS) D 270(6)(21)(22)(23)(25), 271(1)
C R SEANCES SOC BIOL FILIALES 163(12)
CAN FIELD NATUR 84(1)
CAN J ZOOL 47(6), 48(2)(4)
CAT AMER AMPHIB REPT: 91.1, 92.1, 93.1, 94.1, 95.1, 96.1, 97.1, 98.1, 99.1, 100.1
CHESAPEAKE SCI 11(2)
CHROMOSOMA 30(1)(2)
CIRCULATION 39-40(suppl 3)
COMP BIOCHEM PHYSIOL 34(3)(4), 35(1)
COPEIA 1970(3)
DAILY EXPRESS (LONDON) 25 August 1969, 30 July 1970
DATELINE SCI 5(11)(12)
DESERT 33(9)
DEVELOP BIOL 22(2)(3)
DEVELOP GROWTH DIFFER 11(4)
DOKL AKAD NAUK SSSR BIOL SCI SECT (TRANSL) 156(1-6), 184(1-6), 185(1-6), 187(1-6)
ECOLOGY 50(6), 51(2)(3)
ENTOMOLOGIST 103(1281)
EXP CELL RES 60(3), 61(1)
EXPERIENTIA (BASEL) 26(4)(5)(6)(7)
EXPLORER 12(2)
FAO FISH REP (71.1)
FAUNA BULL (WEST AUST) 4(1)
FAUNA (OSLO) 23(1)
FED PROC 29(2)
FED REGIST 35(106)
FIZIOL ZH SSSR IM I M SECHENOVA 56(5)
FLA NATUR 43(1)
FLA WILDLIFE 24(2)
FOLIA BIOL (KRAKOW) 18(2)
FORMA FUNCTIO 1(2)(3)(4), 2(2)
FRAGMENTA BALCANICA 7(8)
FREUNDE KOELNER ZOO 12(3)
GEGENBAURS MORPHOL JAHRB 114(3)
GEN COMP ENDOCRINOL 14(1)(3), (suppl) 2
GENETICS 64(1)
GEOGR J 136(1)
GEOGR MAG 42(10)
GEOL MAG 106(5)
GREAT BASIN NATUR 30(1)
HASTINGS EAST SUSSEX NAT 11(1)
HERPETOL REV 2(3)
HERPETOLOGICA 26(2)
ILL BIOL MONOGR (43)
IMMUNOLOGY 18(2)
INDIAN J MED RES 21(2)
INT ASS THEOR APPL LIMNOL PROC 17(2)
ISRAEL J MED SCI 6(2)
IUCN BULL 2(15)
IUCN PUBL (N.S.) 20
IZV AKAD NAUK KAZ SSR SER BIOL 1970(2)
J ACOUST SOC AMER 47(6)(2)
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J ANAT 106(2)
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J EMBRYOL EXP MORPHOL 23(2)(3)
J ENDOCRINOL 47(2)
J EXP BIOL 52(3)
J EXP ZOOL 174(2)(3)
J GEN PHYSIOL 55(6), 56(1:part1) (2)
J GRAD RES CENTER S METHODIST UNIV 38(3-4)
J MICROSC 9(2)
J MOL BIOL 51(2)
J MORPHOL 131(2)(3)
J NEUROPHYSIOL 33(3)(4)
J PHYSIOL (CAMBRIDGE) 208(2)(3), 209(1)
J PHYSIOL (PARIS) 61(6), 62(suppl 1)
J ROY SOC WEST AUST 52(4)
J SUBMICROSC CYTOL 1(2)
J THEOR BIOL 27(3)
J ULTRASTRUCT RES 31(1-2)(5-6), 32(1-2)
J ZOOL (LONDON) 161(2)
JAP HEART J 10(6)
KINGFISHER 5(4)
KY HAPPY HUNTING GROUND 26(4)
LAMMERGEYER (11)
LIFE SCI 9(10)(13)
MAMMAL CHROMOSOMES NEWSLETT 11(3)
MANCHESTER MUS REP 1968-1969
MED CULT 1(8)
MED J AUST 1(2)(4)(8)
MEM MUS ANTHROPOL UNIV MICH (1)
MEM NAT MUS VICTORIA (31)
MITT SCHWEIZ ENTOMOL GES 43(1)
MONIT ZOOL ITAL 3(4)
MONT WILDLIFE ANIM MONT SER (1)
N DAK OUTDOORS 32(12)
N Y TIMES 23 Aug 1970
NAHO 2(3)
NASA TECH TRANSL (F-615)
NASA WALLOPS 1970
NATUR HEIMAT 29(4), 30(1)
NATUR UND MUSEUM 99(6), 100(1)(2)(4)
NATURE (LONDON) 226, 227(5259)
NATURWISSENSCHAFTEN 57(6)
NETH J ZOOL 19(4)
NEUROSCI TRANSL (12)
NEV STATE MUS ANTHROPOL PAP (14)misc. pap (4)
NEW SCI 47(713)
OECOLOGIA (BERLIN) 4, 5(1)
OHIO J SCI 70(4)
OISEAUX 30(329-330)
ORNIS FENN 47(1)
PHYSIOL ZOOL 43(2)
POZNAJ SWIAT 18(5)
PRIRODA (MOSKVA) 1970(2)
PROC ARKANSAS ACAD SCI 23
PROC BIOL SOC WASH 83(21)
PROC DORSET NATUR HIST ARCHAEOL SOC 91
PROC HELMINTHOL SOC WASH 37(2)
PROC NAT ACAD SCI INDIA SECT B BIOL SCI 39(1-2)
PROC NAT ACAD SCI U S A 66(3)
PROC SOC EXP BIOL MED 134(3)
QUART J FLA ACAD SCI 32(2)(3)
QUART J TAIWAN MUS TAIPEI 22(3-4)
RADIAT RES 43(1)
RECENT RESULT CANCER RES (SPEC SUPPL)
REP S AUST MUS July 1968-June 1969
RESP PHYSIOL 10(1)

REV ESPAN FISIOL 26(2)
REV ROUM PHYSIOL 7(1)
RHODESIA SCI NEWS 4(2)
RIC SCI 39(7-9)
RIV BIOL (PERUGIA) 63(1)
RIV PARASSITOL 31(1)
S AFR PANORAMA 15(3)
SCI NEWS 95(23)
SENCKENBERGIANA BIOL 51(1-2)
SHOWA IGAKKAI ZASSHI 29(6)
SITZ OESTERR AKAD WISS MATH NATUR KL ABT I 178(1-4)
SNAKE 2(1)
SPOTS AND STRIPES 7(1)
STATE GEOL NATUR HIST SURV CONN BULL (103)
STUD FAUNA CURACAO CARIBB ISL 31
SUNSET 145(2)
SYMP SOC GEN MICROBIOL (20)
TENN CONSERV 36(8)
TERRE VIE 1970(1)(2)
TEX J SCI 21(4)
TEX PARKS WILDLIFE 18(7), 28(6)(8)
TIMES (LONDON) 30 July 1970
TORTUGA GAZETTE 6(7)
TRANS ILL STATE ACAD SCI 63(1)
TRANSVAAL MUS REP 1969
TSITOL GENET 4(3)
TSITOLOGIYA 12(5)
U S ARMY EUR RES OFF CONTRACT REP (DAJA 37-69-C-0252)
VA WILDLIFE 31(6)(7)
VAKBL BIOL 1970(7)
VET MED 65(2)
WEST AUST NATUR 11(6)
WILDLIFE AUST 7(2)
WILDLIFE N C 34(8)
WILHELM ROUX ARCH ENTWICKLUNGSMECH ORGANISMEN 165(1)
WILSON BULL 82(1)
Z VERGL PHYSIOL 68(1)
ZOOL GARTEN (NF) 37(1-3)
ZOOL JAHRB ABT ALLG ZOOL PHYSIOL TIERE 75(1)
ZOOL JAHRB ABT ANAT ONTOGEN TIERE 87(2)
ZOOL ZH 49(6)
ZOONOOZ 42(7), 43(6)

LIST OF GAZETTEERS

The Department of the Interior, as one of its major responsibilities for standardization of Federal usage of both domestic and foreign geographic names, established the United States Board on Geographic Names. This board published the following gazetteers which we found very useful in tracing localities in foreign countries. Most of them are available free from U.S. Army Topographic Command, 6500 Brooks Lane, Washington, D.C. 20315. Some of them are available for a nominal charge from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Each gazetteer contains thousands of entries for places and features. Entries include standard names approved by the above board and unapproved variant names, the latter cross-referenced to standard names. Reference to the maps used for the basic names covered is given in each gazetteer. Since practically all geographic terms have varied meanings, the senses in which the designated terms are used and the range of features to which they are applied in each gazetteer are stated to reduce ambiguity. The distinctions that can be made in a given gazetteer will vary with the quality of the maps of the area and with the nature of the entities that are named.

UNITED STATES BOARD ON GEOGRAPHIC NAMES. Gazetteer.
1+ , 1955+

1. British East Africa, 1955
2. Madagascar, Reunion, Comoro Islands, 1955
3. Jordan, 1955
4. Bolivia, 1955
5. Hong Kong, Macao, Sinkiang, Taiwan, Tibet, 1955
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8. Albania, 1955
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20. Angola, 1956
21. Uruguay, 1956
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23. Italy and Associated Areas, 1956
24. Hawaiian Islands, 1956
25. Nicaragua, 1956
26. El Salvador, 1956
27. Honduras, 1956
28. Haiti, 1955
29. Southwest Pacific, 1956
30. Cuba, 1957
31. South Atlantic, 1957
32. Indian Ocean, 1957
33. Dominican Republic, 1957
34. French West Indies, 1957
35. Paraguay, 1957
36. Ecuador, 1957
37. Iraq, 1957
38. Puerto Rico, Virgin Islands and other islands and banks in the Caribbean, 1958
39. South Pacific, 1957
40. Australia, 1957
41. Libya, 1958
42. U.S.S.R. and Neighboring Areas (7 Volumes), 1959
43. Germany - Soviet Zone and East Berlin, 1959
44. Bulgaria, 1959
45. Egypt and Gaza Strip, 1959
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48. Rumania, 1960
49. Ceylon, 1960
50. Portugal & Cape Verde Islands, 1961
51. Spain & Andorra, 1961
52. Hungary, 1961
53. Denmark & Faeroe Islands, 1961
54. Arabian Peninsula, 1961
55. Yugoslovia, 1961
56. Venezuela, 1961
57. Iceland, 1961
58. Southern Vietnam and South China Sea, 1961
59. Gabon, 1962
60. Cameroon, 1962
61. Republic of Congo, 1962
62. Finland, 1962
63. Rio Muni, Fernando Po, and Sao Tome e Principe, 1962
64. Central African Republic, 1962
65. Chad, 1962
66. Austria, 1962
67. Pakistan, 1962
68. Sudan, 1962
69. Laos, 1962
70. Mainland China, Administrative Divisions and Their Seats, 1963
71. Brazil, 1963
72. Sweden, 1963
73. Belgium, 1963
74. Cambodia, 1963
75. North Korea, 1963
76. Zanzibar, 1964
77. Norway, Svalbard, and Jan Mayen, 1964
78. Kenya, 1964
79. Northern Vietnam, 1964
80. Republic of the Congo (Leopoldville), 1964
81. Tunisia, 1964
82. Uganda, 1964
83. France, 1964
84. Burundi, 1964
85. Rwanda, 1964
86. Colombia, 1964
87. Upper Volta, 1965
88. Senegal, 1965
89. Ivory Coast, 1965
90. Guinea, 1965
91. Dahomey, 1965
92. Tanzania, 1965
93. Mali, 1965
94. Guatemala, 1965
95. South Korea, 1965
96. Burma, 1966
97. Thailand, 1966
98. Togo, 1966
99. Niger, 1966
100. Mauritania, 1966
101. Sierra Leone, 1966
102. Ghana, 1967
103. Argentina, 1968
104. Syria, 1967
105. Portuguese Guinea, 1968
106. Liberia, 1968
107. Gambia, 1968
108. Spanish Sahara, 1969
109. Mozambique, 1969
110. Panama and the Canal Zone, 1969
111. Undersea Features, 1969
112. Morocco, 1970
113. Malawi, 1970
114. Israel, 1970

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UNREVIEWED-UNEDITED COMMUNICATIONS
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THE "QUADRIFURCATE" HEMIPENIS OF TROPIDOPHIS

Frances W. Gibson

A "quadrifurcate" hemipenis (i.e., a bilobed hemipenis in which the lobes are again divided to form two pairs of secondary lobes) was described in certain species of the boid genus Tropidophis by Stull (1928). She described in detail the hemipenis of all the species recognized in this genus at that time, except the mainland species T. pauciscuamous and T. taczanowski. She illustrated the organ in nine forms, showing it in the in situ inverted position, split for examination.

She used hemipenial form in her separation of Tropidophis into the "Maculatus Group," defined as having bifurcate, longitudinally laminate hemipenes and smooth scales (maculatus and, tentatively, pauciscuamous), and the "Pardalis Group," with quadrifurcate, flounced hemipenes and keeled scales (pardalis, melanurus, wrighti, semicinctus, and, tentatively, taczanowski).

Bailey (1937) accepted Stull's hemipenial descriptions and subgeneric groups. Schwartz and Marsh (1960), however, disagreed both with her groupings and her descriptions of the hemipenes. After stating that keeled and smooth scales were intraspecifically variable, they commented about her observations of the hemipenis (1960: 53-54):

> Stull's second character, that of the forking of the hemipenis, is apparently equally untenable. We have examined by dissection the hemipenes of all forms pertinent to the study. In addition, a few recently preserved specimens have the hemipenes extruded. In no cases have we seen quadrifurcate hemipenes. The appearance of double bifurcation is at times given by the bands of retractor muscle fibers, but in every case where this superficial resemblance to a quadrifurcate hemipenis was seen upon dissection, careful observation revealed that the hemipenis was in actuality bifurcate. Extruded hemipenes (*nigriventris, barbouri, jamaicensis, pardalis*) likewise are uniformly bifurcate and show no evidence of the quadrifurcate condition. It is pertinent to point out here that Stull (*op. cit.*:11) cited only a single male (MCZ 12445) of *maculatus* examined; we have studied this snake. It lacks spurs, and the tail has been dissected; what were apparently considered as being hemipenes are in reality the paired scent glands, filled at present with much fragmented and solidified musk. The snake is obviously a female; however, dissection of available *maculatus* males reveals that they do indeed have a bifurcate hemipenis, as do all other known members of the complex.

This would appear to settle the matter, and indeed no further investigations of the hemipenis of Tropidophis have been reported.

While preparing hemipenes for the Genera of Reptiles Project, I everted completely the hemipenis of Tropidophis melanurus (Fig. 1). Though the hemipenis is small, thin and delicate, there is no question of the presence of secondary division of the primary lobes, giving the "quadrifurcate" condition described by Stull (1928). This discovery raised the question of the validity of Stull's other observations.

PROCEDURE AND DESCRIPTIONS

The only pertinent specimens readily available had been preserved with the hemipenes in the inverted state. However, by soaking them in glycerine, and then in a solution of trisodium phosphate and "Calgonite," (Gibson, 1970: MS) it was possible to soften the tissues sufficiently for eversion. Everting the hemipenis is a laborious process in such snakes as these in which the organ is small and delicate. However, it is well worth-while, because it resolves such questions as to the organ involved (muscle fibres do not evert; scent glands have no characteristic ornamentation), and its shape and structure. Four specimens of three species were everted by this method. Their descriptions, and some discussion of a fifth individual follow.

Tropidophis melanurus (AMNH 82881, 82882).

-- The everted hemipenis is eight subcaudals long (about 13 mm). The primary division into two lobes is at about the mid-length of the organ. Distally the primary lobes redivide, forming two pairs of secondary lobes that occupy about the apical one-eighth of the organ. The sulcus forks at the level of the bilobation. Its branches extend up the medial surface of the



FIGURE 1. Everted left hemipenis of Tropidophis melanurus (AMNH 82882). Note the presence of secondary lobes.

primary lobes (centripetal). The lips of the sulcus become small and indistinct on the secondary lobes. The sulcus appears to subdivide on the right primary lobe of the hemipenis of AMNH 82881, but this cannot be seen on the left lobe, or on either lobe of the hemipenis of AMNH 82882. /Stull (1928: 40) reported that the sulcus did not divide in this species./

The hemipenis is ornamented with flounces and papillae. Scattered large papillae are found proximally. Distally these join to form pronounced transverse flounces. The flounces are reduced in size and extend longitudinally on the distal parts of the primary lobes and on the secondary lobes. Several large papillae are near the distal end of the basal region on the sulcate side of the organ; a single large papilla is on the asulcate side.

Apparently Stull cut off part of the base of the organ, thus altering her proportional

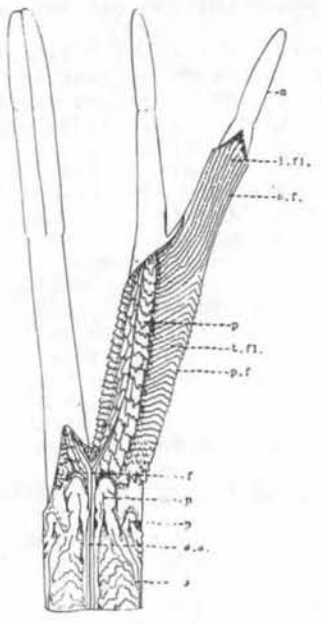


FIGURE 2. Hemipenis of Tropidophis maculatus from Stull (1928: Fig. 9).

descriptions (e.g., the point of forking of the sulcus becomes about one-half the length, instead of one-third). Apparently, also, the four large papillae on the base which she mentions and figures (1928: Fig. 9) become bulges when the organ is inflated. Otherwise, however, the organ agrees with her description and figure in all important respects (Fig. 2).

Tropidophis pardalis (AMNH 78605).

-- The everted hemipenis is eight subcaudals in length (approximately 16 mm). In form it corresponds very closely to Figure 2 in Stull (1928), and to my figure of I. melanurus (Fig. 1). Again, the overall proportions are changed through the loss of the base of the organ. The secondary lobes (giving a "quadrifurcate" organ) are clear. The lips of the sulcus appear to divide distally, with one lip extending up each of the secondary lobes.

Tropidophis canus curtus (AMNH 93001).

-- The everted hemipenis is six subcaudals long (approximately 11 mm). The form corresponds closely to that of I. melanurus and I. pardalis. /In fact, this form was considered a subspecies of I. pardalis by Stull (1928: Fig. 4). See Stimson (1969: 32-38) for a recent arrangement./ The longitudinal flounces occupy about half the length of the primary lobes, rather than beginning near the distal ends as in I. melanurus. As in I. pardalis, the lips of the sulcus separate at the point of subdivision of the primary lobes, one lip extending onto each of the secondary lobes.

Tropidophis maculatus (MCZ 12445).

-- I agree with Schwartz and Marsh (1960), as quoted above, that this specimen is a female. Whether there was a mixup of specimens or numbers cannot be determined at this late date. However, I do not believe that Stull (1928) could have drawn her Figure 1 from the scent glands of a specimen which were still "filled with...musk" when it was examined by Schwartz and Marsh.

SUMMARY AND CONCLUSIONS

The hemipenes of four specimens of Tropidophis were everted to determine the validity of Stull's (1928) descriptions of "quadrifurcate" hemipenes in this genus of snakes -- a hemipenial form otherwise unknown among snakes. In contrast to the statements of Schwartz and Marsh (1960), the hemipenes were found to be "quadrifurcate" (probably better called quadrilobate) in I. melanurus, I. pardalis, and I. canus, as described by her.

Stull (1928: 10) described the hemipenis of I. maculatus as bilobed; this was, in effect, "confirmed" by Schwartz and Marsh (1960: 54). However, in view of the apparent mixup of Stull's specimens and the unreliability of hemipenial descriptions in the literature, fresh material is badly needed for proper examination and description.

It seems only just to point out that the specimen used for illustration (Fig. 1) was from a snake collected and preserved (with the hemipenes partly everted) by Albert Schwartz. It is unfortunate that Miss Stull did not live to see her observations corroborated.

ACKNOWLEDGEMENTS

I thank Ernest E. Williams, Museum of Comparative Zoology at Harvard University (MCZ), and Richard G. Zweifel, of this Museum (AMNH), for their permission to utilize specimens from collections under their supervision. I also thank H. G. Dowling, I. Gilboa, and Dr. Zweifel for their comments on the manuscript.

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New York, N.Y. 10024
(Received 30 October 1970)

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MEETINGS

AND

SOCIETIES

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CALENDAR 1970

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26-31+December....AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Annual Meeting, Chicago.

26-30+December....VERTEBRATE MORPHOLOGY DIV., AMERICAN SOCIETY OF ZOOLOGISTS, Annual Meeting (with AAAS).

28-29+December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Conrad-Hilton, Parlor 413, Chicago (with AAAS).

28-29+December....SSAR Board of Directors Meeting (with AAAS).

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CALENDAR 1971

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15-19+June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Los Angeles.

19-22+August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Univ. New Mexico, Albuquerque.

29+August - 4 September....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Colorado State Univ., Fort Collins.

28-29+December....HERPETOLOGISTS' LEAGUE, Annual Meeting, Philadelphia (with AAAS).

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INDIVIDUALS

AND

INSTITUTIONS

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The ORGANIZATION FOR TROPICAL STUDIES, a consortium of 27 Latin American and U.S. universities, will offer its ninth year of graduate courses in tropical science in Central America. Among the course offerings are Terrestrial Biology and Ecology. Catalogue and applications may be obtained from: OTS North American Office, 5900 S.W. 73rd St., South Miami, Fla. 33143.

NATHAN W. COHEN (Extension, U Cal, Berkeley) exhibited 94 of his outstanding color photographs of amphibians and reptiles at the U.S. National Museum (Washington) in July and August, and at the American Museum of Natural History (New York) in October and November.

THOMAS C. CHENG has been named director of the new INSTITUTE FOR PATHOBIOLOGY at Lehigh University, Bethlehem, Pa. Among other projects, the Institute will investigate rejection mechanisms in cold-blooded vertebrates and tumors and cancers in "lower forms" of animals.

ROBERT E. GORDON (Notre Dame U) has been made a member of the U.S. National Committee of the International Union of Biological Sciences.

E. PETER VOLPE (Newcomb Col, Tulane U) was reappointed to represent the AIBS on the U.S. National Commission for UNESCO.

STEPHEN G. TILLEY (Ph D, U Mich, 1970) was appointed assistant professor, Dept. Biological Sciences, SMITH COLLEGE. His dissertation was, "Aspects of the reproductive and population ecology of Desmognathus ochrophaeus in the southern Appalachian Mountains." He continues to work on the population ecology and demography of D. ochrophaeus populations on wet rock faces in the southern Appalachians.

SOPHIE JAKOWSKA (27 W 96th St, NYC 10025) has suggested the establishment of a "BUFO MARINUS INFORMATION EXCHANGE" to aid in evaluating the research value and potential of this widespread species.

JAMES BERRY and CULVER GIDDEN (Fla. State U) are investigating a population of Clemmys guttata from near St. Marks, Fla. and Jim is contemplating study of Pleistocene turtles from the Aucilla River.

BRUCE MEANS (Fla. State U) is about halfway finished with an annotated checklist of the reptiles and amphibians of the Tall Timbers region. Work on that manuscript is presently halted until January while he finishes his Master's thesis on the genus Desmognathus in Florida.

CLIVE LONGDEN (Fla. State U) is studying the ecology and morphological variation of Hyla andersoni in Florida.

ANGUS d'A. BELLAIRS has been appointed the first Professor of Vertebrate Morphology at the University of London.

PAUL F.A. MADERSON and STANLEY N. SALTHE have been raised to Associate Professor rank, and thus made members of the tenured faculty of Brooklyn College.

WALTER AUFFENBERG (Fla. State Mus., Gainesville) recently returned from 11 months on Komodo Island with much information on ecology and life history of the giant monitor. He hopes to return to the region in 1971.

WILLY BECAK (Inst. Butantan, Sao Paulo) attended the AIBS and SSAR meetings, and visited a number of institutions before returning to Brazil.

EAST AFRICAN STUDY TOUR

The Faculty of Zoology and the Office of International Programs of THE OHIO STATE UNIVERSITY (Columbus, Ohio 43210) announce plans for a study tour to Kenya and Tanzania, Spring Quarter, 1971. The tour is entitled "Ecological and Biogeographic Problems in East Africa", and is open to selected advanced undergraduate and graduate students throughout North America. Up to 15 quarter hours credit can be earned. Participants will have to register at OSU, spend 5 weeks in preliminary course work on campus, then 7 weeks in Africa, the last 10 days of which are free time. The charter plane (Pan Am Boeing 707) leaves Columbus May 5 and returns on June 23. Present estimates for cost of round trip to Nairobi and expenses in Africa are about $1,200 - 1,300 per student, plus expenses on campus; or, a total estimate of $2,000 for the entire quarter.

Faculty personnel are Dr. BARRY D. VALENTINE, past chairman of section A, (Systematics, Morphology, and Evolution) of the Entomological Society of America, life member of the American Society of Ichthyologists and Herpetologists, fellow of the Herpetologists League, etc., principal interests in systematics and biogeography; and Dr. ABBOT S. GAUNT, member American Society of Zoologists, Society for the Study of Evolution, Society for Systematic Zoology, American Ornithologists Union, Cooper Ornithological Society, Wilson Ornithological Society, New York State Postdoctoral Fellow, Faculty Research Awards for studies in avian anatomy, principal interests in functional morphology, ecology, and systematics.

DEADLINE for applications is 1 February 1971.

MALAYSIANS WITNESS FROGS' WAR TO DEATH

KUALA LUMPUR, Malaysia (AP) — More than 3,000 frogs of four different varieties fought a furious battle lasting more than six hours, local newsmen reported Sunday. They said the frog war took place in a swampy valley beside a Hindu temple at a rubber estate near Sungai Siput, 100 miles north of Kuala Lumpur.

At first, only about 50 frogs were involved but soon the numbers swelled, the newsmen reported, adding that about 1,000 people assembled to watch the frogs bite and tear at each other. Many were dead at the end of the battle.

Maria Soosay, 30, who has lived for years near the area, said the war is almost an annual event.

"But they have been small fights. This is the biggest so far," he said.

Local superstition has it that frog wars come just before big national disasters. Just 12 days before the Malay-Chinese race riots May 13 last year a small frog war was reported to have taken place at Butterworth, 200 miles northwest of here.

Other frog wars have been reported at various times in different parts of west Malaysia. No one has so far come forward with any theory why such battles take place.

9nov1970

A Jump Ahead of Toads

NEW YORK POST, WEDNESDAY, SEPTEMBER 23, 1970 14

PLEASANTVILLE, N. J. (AP)—"The Invasion of the Toads" sounds like something you'd see on a late night TV horror show, and a horror it is for Mr. and Mrs. Fred Miller of this small Jersey town.

The toads have invaded, and they are atop the TV, in front of it, in the bathroom and all over the house.

For the past three summers the Millers' ranch-style home has been visited by toads, but only one or two at a time. This summer came the invasion.

Seventy-three were caught in the Miller home in one night. During a recent visit there were about 35 toads in the living room, 10 in the kitchen, 20 in the den and between five and seven in the bathrooms and bedrooms.

Miller said he has consulted with exterminators and agricultural officials. No one can explain how the toads get in the house or where they come from.

None of the houses in the neighborhood has the problem, and there are no swamps or marshes nearby.

TALL TIMBERS RESEARCH STATION

A research collection of reptiles and amphibians from western Florida, southern Alabama, and southern Georgia was built this past summer and is presently housed in the Museum of Tall Timbers Research Station, Route 1, Box 160, Tallahassee, Florida. The collection totaled about 5000 specimens on September 15th. Among the significant additions to the knowledge of the herpetology of Florida was the discovery of Desmognathus monticola from Escambia Co. (Means and Longden, HERPETOLOGICA, in press) and Hyla andersoni from Okaloosa Co. (Christman, QUART J FLA ACAD SCI, in press).

RESEARCH GRANTS

The AMERICAN MUSEUM OF NATURAL HISTORY invites applications for grants from the THEODORE ROOSEVELT MEMORIAL FUND, established to provide financial assistance to persons, especially younger scientists, conducting research on wildlife conservation or natural history (with zoological rather than botanical emphasis) in North America north of Mexico.

Grants are normally in small sums of not more than several hundred dollars, and are not usually made for salaries or the purchase of non-expendable equipment. The deadline for applications is 1 March, with awards announced in April. For application forms and additional information, write to:

Theodore Roosevelt Memorial Fund

THE AMERICAN MUSEUM OF NATURAL HISTORY

Central Park West at 79th Street

New York, N.Y. 10024

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BOOK REVIEW

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A TAXONOMIC SURVEY OF COLOMBIAN ANURANS

Colombia is a land of complex physiography and diverse environments; these attributes, in combination with the important biogeographic situation, result in a fantastically diverse biota that has attracted the attention of biologists for many decades. Despite the potential for herpetological research in Colombia, relatively few herpetologists have made substantial contributions to our knowledge of the rich herpetofauna. Hno. Niceforo Maria has published numerous papers on the herpetofauna and has cooperated with various North American herpetologists, especially Emmett R. Dunn, who spent a year in Colombia in 1943 and 1944 and published many papers on the herpetofauna, principally in the journal Caldasia. Federico Medem continues to work on the turtles and crocodilians of Colombia.

The only faunistic study of amphibians and reptiles made in Colombia is that on the Sierra Santa Marta by Ruthven (1922, Misc. Publ. Mus. Zool. Univ. Michigan, no. 8, 69 pp.). Beginning in the mid-1950's, the late Doris M. Cochran began studying preserved frogs from Colombia. Subsequently, she was joined in her endeavors by Coleman J. Goin; together they attempted to survey the frogs of Colombia. Although the manuscript was essentially completed more than four years ago, the death of Dr. Cochran and various problems delayed the publication of the Frogs of Colombia until July, 1970.

The Frogs of Colombia is Bulletin 288 of the United States National Museum and consists of xii + 655 pages; the publication is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, for $4.

Following a brief introduction and dedication of the work to Hno. Niceforo Maria there are systematic accounts of 212 species and subspecies (28 taxa named as new), a gazetteer of Colombian collecting localities, and 68 plates. Interspersed in the text are 54 line drawings of frogs and one map. Accounts of the species of Hylidae, Centrolenidae, and Microhylidae were prepared by Goin; the other accounts were prepared by Cochran.

A comprehensive survey of a fauna should provide a summary of known information on the component species, accounts of the distribution of each taxon, discussions of the variation within and between populations, and most importantly keys, diagnoses, and illustrations that will permit the ready identification of specimens.

Cochran and Goin have been only partially successful in meeting these criteria. Although a list of locality records and specimens examined is appended to each species account, no statements of geographical distribution are given. Thus, the reader is compelled to plot the locality records and draw his own distribution map before arriving at an idea of the distribution of a given species. The authors had very limited field experience with Colombian frogs; this deficit is extremely apparent in their lack of knowledge of the animals in life and the nearly complete absence of statements on the ecology and life histories of the species.

The individual species accounts are variable in their usefulness; most are based on the detailed description of a single preserved specimen, in many cases the holotype, even though it may be in poor condition and even though fresh material was available. The practice of utilizing one specimen for a description is still widespread amongst older taxonomists despite George Myers' (Copeia 1950(3): 206) fiery critique:

> "It seems to have been the late Dr. Stejneger who initiated the present widespread American herpetological custom of composing a formal specific description from the detailed description of an individual specimen accompanied by notes on the variation of the other examples at hand. When used in the description of a type specimen, this method has the advantage of making clear the exact taxonomic characters of a specimen to which a name is tied, and avoids the possible danger that two different forms may be confused in the type description. But beyond this purely nomenclatural utility, the method has little conceivable value except to enable a hurried systematist to deliver an imposing description without taking time to examine in detail more than a single specimen. To use this method in a general systematic treatise, except as an adjunct, where the identity of types or aberrant individuals is in question, is little less than a fraud upon the scientific public, chiefly because the authors so using it are usually purely perfunctory or woefully remiss in giving the full details of variation seen in the bulk of their material. In a treatment of natural populations, what we are interested in is the nature of the population in hand, not of any individual, unless that individual happens to be intrinsically of special importance."

In most cases the species accounts are less than adequate for proper identification of specimens. This is due primarily to the authors' use of a single specimen for the description and entirely inadequate diagnoses (no diagnoses in accounts prepared by Cochran). Cochran's usage of Ridgeway's (1886, A nomenclature of colors for naturalists...) terminology for colors of preserved specimens is probably more detrimental than useful, because a worker having before him a living or recently preserved specimen can be led astray by colors based on old preserved specimens.

The keys to most of the large genera are not especially useful. Repeated attempts to key out known specimens of Atelopus and Eleutherodactylus have failed. The genus Hyla is divided into 22 groups, and keys are presented to the members of each of the 12 groups containing two or more species, but there is no key to the groups!

The taxonomy of some of the groups is erroneous. This is due to two factors. Firstly, the literature of the past five years has not been incorporated into the text; only one reference more recent than 1965 is listed in the Literature Cited. Secondly, the authors neglected several named taxa from adjacent geographical regions, especially Ecuador and Panama. The result is that names used by Cochran and Goin in some cases have been synonymized, or species named as new by them actually have older names based on specimens from other geographic regions.

The illustrations in the text vary from fair to poor; most of them lack depth and sufficient detail to be useful. The plates are categorically poor. This is not due to bad photography, but rather the subject. Black and white photographs of old, wrinkled, dried, and faded types show nothing more than the miserable state of the specimen.

The gazetteer and extensive literature cited are welcomed by the student of Colombian frogs; these will be very useful.

The Frogs of Colombia is a beginning at a synthesis of the large and diverse anuran fauna of northwestern South America. This reviewer cautions the users of the book to check carefully the identifications resulting from the use of the keys and to take into consideration that the authors have presented little data on intraspecific variation and have misapplied some specific names (these will be discussed in detail in a paper now in preparation). It is hoped that the present publication will provide the incentive for modern approaches to the study of Colombian anurans including the utilization of data on life histories, ecology, and mating calls.

Lest I be judged as an over-critical reviewer, I should like to point out that I am well aware of the tremendous amount of work that has gone into the Frogs of Colombia. Much of this kind of work is a thankless task that does not reap praise from modern biologists, but nevertheless is essential to the various disciplinary approaches now practiced by competent biologists who are neither able nor willing to undertake such a mundane chore. Thus, we should thank the late Doris M. Cochran and Coleman J. Goin for their efforts in making future work in Colombia a little bit easier for the rest of us.

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BOOK REVIEW

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A LABORATORY PERSPECTUS OF SNAKE ANATOMY. By Jonathan C. Oldham, Hobart M. Smith, and Sue Ann Miller. 1970. Stipes Publishing Company (10 Chester Street, Champaign, Illinois). v + 98 p. $4.75.

In spite of the considerable interest in snake anatomy and the rather large number of technical papers on some small aspect of snake anatomy, very few general accounts of the total gross anatomy of any one species of snake exist. The present account, based principally on Natrix rhombifera, is therefore welcome. I hope it will be successful -- so successful, in point of fact, that a revised edition is issued. A considerable number of revisions are in order.

Any inductive science demands two kinds of work, which may be called the journalistic and the philosophical. The journalistic aspect of science is the accurate reporting of the phenomena of the universe, and the philosophical aspect is the framing of explanations of these phenomena along certain rules of scientific explanation, such as minimum number and maximum generality of factors, etc. Human nature being what it is, anyone involved in the philosophical aspect is under temptation to dabble illicitly in the journalistic and make data fit an interesting explanation; and anyone involved in the journalistic aspect is always tempted (by shortness of attention span, if nothing else) to drop the often dull task of recording nature and relax in explaining nature. A perspectus of snake anatomy is a task in the journalistic aspect of science, and where the authors of the work under review have confined themselves to journalistic reporting they have performed a useful service.

Unfortunately, in sallying forth into philosophical aspects, they have wasted some opportunities for being useful and perform only a service that most herpetologists and many bright students could do for themselves, and do better. Thus a classification and phylogeny of snakes is presented without diagnoses or other justifying arguments, but as a list of names (including some invented "vernacular" names, such as "Dawn blindsnakes" for Anomalepididae, "Big jawed blindsnakes" for Leptotyphlopidae, and "Coralline snakes" for terrestrial proteroglyphs other than mambas). Although this classification is said to be "A commonly accepted arrangement," some features seem to be decidedly novel, such as division of the Crotalidae into "Subfamily Lachesinae (Bushmasters)" and "Subfamily Crotalinae (Viviparous pitvipers)." Without more explanation it is difficult to guess where oviparous Asiatic pit vipers without a rattle would be placed, since those who have

recognized Lachesinae and Crotalinae (e.g. Cope) have done so on the basis of absence or presence (respectively) of a rattle. Unexplained phylogenies and classifications are frequent appendices to popular natural histories that are concerned with interesting behaviour, folk-lore, etc. Such an appendix to a textbook on snake anatomy seems inexplicable unless the authors believe it unlikely that anyone has learned much from the preceding pages.

Although it might seem a good idea to include anatomical information on a variety of snakes, rather than on a single species, the results are unfortunate. The skull of Elaphe combined with the head muscles of Natrix is just the sort of imperfect information herpetologists have available in the literature, permitting no precise concept of muscle insertion and its effects on skull structure. (Incidently, the drawing of the head muscles of Natrix rhombifera does not closely resemble any of the nine specimens of this species I have dissected for head muscle study, and the drawings of the "skull of colubrine snakes, composite, largely of Pilot blacksnake, Elaphe obsoleta" show a number of oddities, such as an interdigitate and presumably rigid suture between the postorbital and parietal and a splenial bone extending into the lateral wall of the Meckelian canal.) This mixing of subjects results in a knowledge of snake anatomy similar to the concept of human anatomy in early Renaissance time, when pig-and-monkey-anatomy were confused with observations on human cadavers. A precise knowledge of man's place in the phylogeny of mammals would not have been possible without the careful culling out of non-human from human anatomy, and a full appreciation of the phylogeny of snakes is not made any easier by jumbling together the structures and adaptations of forms leading quite different lives and defending quite different ecologic niches.

The presence of a spinal accessory nerve in a snake was surprising to me, and I would have liked some documentation. Surprising also is the simple hypoglossal nerve issuing from a single foramen. (In the Natrix rhombifera I have dissected, two small rami of the hypoglossal issue from small foramina buried deeply in a common pit with the vagus foramen, while a larger branch issues from a foramen behind the compound vagus-hypoglossal passageway; another small foramen, dorsal to the hypoglossal foramen, is generally counted as one of the hypoglossal foramina, although the nerve issuing from it innervates epaxial muscles, principally the obliquus capitis; indeed, the last-mentioned nerve and large "main" hypoglossal remus seem to correspond to the first spinal nerve of lizards, incorporated into the cranial complex by backward extension of the skull, and the true hypoglossal is represented by the small branches associated with the vagus and unmentioned in the work under review.) The use of the term "otic nerve" for the auditory nerve of snakes is unfortunate, since "otic nerve" has a quite different meaning in fish anatomy: as the branch of the lateralis system associated with the facial nerve and innervating the neuromasts of the supratemporal canal. Identification of the lateral wing of the sphenoid with the pleurosphenoid seems equally erroneous and is certainly not supported by any developmental evidence; probably the best explanation of the lateral wing of the sphenoid of most snakes (it is absent in scolecophidian snakes) is Brock's, that it represents the basipterygoid process of lizards.

Questionable, but conventional and with some "outside authority," is the identification of small lymphoid bodies near the head as ultimobranchial bodies (they have the positional relationships of the anterior thymus bodies of lizards, and "ultimobranchial bodies" anterior to the thymus and thyroid seems contradictory in terms). The elongated dermal bone suspending the quadrate is called the supratemporal in the text and figures, in spite of Broom's demonstration that this bone in Squamata receives the insertion of axial muscles of the neck and is much more likely the tabular. (The bone of lizards usually called squamosal does fit the positional requirements of a supratemporal; probably no living squamatan has a squamosal bone, although the lower Triassic Prolacerta has an element in the expected position of a squamosal, on the lateral surface of the quadrate and well elevated above the jaw articulation, identified, I believe wrongly, as a quadratojugal.) On the other hand, Broom's identification of the reptilian vomer as a "pre-vomer" is accepted, even though the fossil record of the mammal-like reptiles is now so complete as to furnish a perfect transition from a bone in earliest forms with all the relations and appearance of the squamatan vomer to a bone in later (Triassic) forms with all the relations and appearance of the mammalian vomer.

On the positive side, White's studies of the reptilian heart have been incorporated into the work under review, vastly improving this work in comparison to standard comparative anatomy texts.

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ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be typewritten on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $16.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/8 inches (one column) or 9 1/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 12 5/8 inches). Line cuts are reduced 25 per cent in processing.

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.

UNREVIEWED-UNEDITED COMMUNICATIONS

"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

This section is supported entirely by its authors and their sponsors. Page charges pay the costs of publication, distribution, and 100 author's reprints. Illustrations may be included but must be reduced to proper dimensions (see Advice to Authors).

Page charges are: $20 for a single page (148 lines of about 40 characters and spaces); $40 for the two-page maximum (300 lines). Include an allowance for the title and author's name and five lines for the address and received date. [Send a check for the proper amount with the manuscript, or if you prefer, we will bill you that amount for reprints.]

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VOLUME 2, NUMBER 3. SEPTEMBER 1970

CONTENTS

ARTICLES

6 HERPETOLOGICAL SOCIETIES: AMATEUR AND PROFESSIONAL, by H. G. Dowling & Itzchak Gilboa. The specialized and local societies may be an undeveloped resource to the field.

53 A LIST OF HERPETOLOGICAL TYPE LISTS, by H.G.Dowling, I.Gilboa, & R.G.Zweifel.

UNREVIEWED - UNEDITED COMMUNICATIONS

49 MODIFICATIONS OF THE TAYLOR ENZYME METHOD OF CLEARING AND STAINING FOR AMPHIBIANS AND REPTILES, by George R. Zug & Ronald I. Crombie.

51 THE TAXONOMIC RELATIONSHIPS OF XENOPELTIS UNICOLOR, by H. G. Dowling & F. W. Gibson. New morphological data substantiates its relationship to Loxocemus.

DEPARTMENTS

2 EDITORIAL

LETTERS TO THE EDITOR
3 Folkerts & Mount rebut Freeman's comments on Graptemys nigrinoda delticola.
4 Gordon comments on Dowling's "Economics."
4 Gilboa comments on the state of herpetology.

CONSERVATION NEWS
10 Panama protects its amphibians and reptiles, by Charles W. Myers.

BOOK REVIEWS
47 Brame on Cochran & Goin's "New Field Book."
48 Kour on T. A. G. Wells' "The Frog."

11 CURRENT HERPETOLOGICAL TITLES

HERPETOLOGISTS RECORD
50 Dowling corrects an error on hemipenis morphology.

MEMBERS DESIDERATA
55 Dietrich offers herpetological publications.

NEWS & ANNOUNCEMENTS
55 Meetings and Societies
Individuals and Institutions

SOCIETY NOTES
2 The Society for the Study of Amphibians and Reptiles.
3 SSAR Treasurer's report for 1969.
56 Advice to Authors

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New York, New York 10024

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S S A R

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as THE OHIO HERPETOLOGICAL SOCIETY. Following rapid growth of membership and expansion of operations, due largely to the originality and diversity of its publications program, the organization became the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES in 1967.

Purpose. The SSAR encourages the acquisition of knowledge on amphibians and reptiles and the dissemination of scientific information on these animals. It encourages the conservation of wildlife in general, and of amphibians and reptiles in particular. A major effort is made to achieve closer cooperation and effective communication between amateur and professional herpetologists, so that they may work together in the common cause of furthering science.

Publications. The Society publishes the JOURNAL OF HERPETOLOGY, FACSIMILE REPRINTS IN HERPETOLOGY, and HERPETOLOGICAL REVIEW. Members receive all regular issues of these publications.

Membership & Subscriptions. Membership is open to anyone interested in amphibians and reptiles. Regular dues are $6. in the United States and Canada, $5. in other countries; Sustaining dues are $8., Contributing $15., and Life $100. Subscriptions for institutions and individuals are $10. All inquiries about membership or subscriptions should be addressed to the Secretary.

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EDITORIAL

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Again, this time due to mailing problems, this REVIEW has been made up before the membership has seen the last one.

However, the Editor is pleased to point out that this third issue is not completely authored by him, but has contributions from a variety of sources. There are Book Reviews by Brame and Kour, Conservation by Myers, Letters by Folkerts & Mount, Gordon, and Gilboa, and "Unreviewed" by Zug & Crombie. We appreciate all these as well as the end-prints by De Ran, and hope that they presage a new look in the contents of HR.

A rule-of-thumb is developing in regard to the placement of certain articles. Papers of general interest are run as articles, specific and specialized notes are run in "Herpetologists Record" or elsewhere if less than a column in length, as "Unreviewed-Unedited" if one to four columns. We still need articles and unusual photographs from the readership. -- HGD.

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SSAR TREASURER'S REPORT

1969

INCOME

Membership dues		
Regular		$2,850.00
Sustaining		648.00
Contributing		180.00
Foreign		205.00
Institutional		1,280.00
	sub-total	$5,163.00
Sale of author reprints		$955.40
Donations		474.63
Advertising		25.00
	sub-total	$1,455.03
Sale of back issues		
Journal of Herpetology		$401.00
Facsimile Reprints		170.50
Large Facsimile Reprints		939.00
	sub-total	$1,510.50
Advance payment - 1970 dues		$221.00
	TOTAL INCOME	$8,349.53

EXPENSES

Printing costs		
Journal of Herpetology 3(1-2)		$2,090.13
Journal of Herpetology 3(3-4)		1,680.07
Table of Contents Volume 1 & 2		150.09
Boulenger Reprint Part 8		188.26
Boulenger Reprint Part 9		224.44
Weigman Reprint		352.42
Bojanus Reprint promotion brochure		30.50
Herpetological Review #5		247.85
Herpetological Review #6		182.84
Herpetological Review #7		262.59
Herpetological Review #8		232.67
Herpetological Review #9		220.61
	sub-total	$5,862.47
Postage		$657.51
Stationary & Printing		336.00
Transfer of funds to Athens, Ohio		240.00
Membership campaign		143.34
Partial payment on IBM typewriter		100.00
Honararia for 1969 Annual Meeting		100.00
Secretarial assistance		76.00
Bad checks		56.00
Supplies		51.96
Xeroxing		51.50
Long distance phone calls		24.30
Refunds		20.00
Miscellaneous		37.50
Bank charges		2.26
	sub-total	$1,896.37
	TOTAL EXPENSES	$7,758.84

SUMMARY

Total income - 1969	$8,349.53
Total expense - 1969	7,758.84
Balance carried over to 1970	$ 590.69
Balance forwarded to new Society Treas. at Athens, Ohio	$ 590.69
Balance of 1969 money on hand in Lawrence	$ 0.00

LETTERS

Reply to H. L. Freeman's (Herpetol. Rev. 2(1):3) comments on: A NEW SUBSPECIES OF THE TURTLE GRAPTEMYS NIGRINODA CAGLE. -- It is evident from Mr. Freeman's remarks on our recent paper that there are basic conceptual differences between his idea of subspecies and ours. Certain of his comments stem from this fact or from differences of opinion as to the purposes of taxa descriptions, and we welcome them as representative of a contrasting point of view. The majority of his other observations are based on unfounded assumptions, errors of logic and interpretation, and an apparent misunderstanding of certain evolutionary processes.

His statement that we "have failed to show that delticola has any clear-cut sets of characteristics which are peculiar to the region it inhabits" is untrue. The unique characteristics of the subspecies and the area in which they typify the populations were clearly stated. This set of characteristics does not occur in other populations of the species, as a perceptive perusal of the paper will reveal, and is therefore unique.

Mr. Freeman seems disturbed by the fact that the intergrades possess characteristics intermediate between the two subspecies. At least he dwells upon this fact in the fifth paragraph of his comment. Intergradation is the result of an intermixture of genes from two or more subspecies, and intermediacy of characteristics within the zone of intergradation is the expected result. The fact that this phenomenon occurs in G. nigrinoda is neither unusual nor surprising.

Freeman's idea that Figure 6, in which length-height relationships of the shell are plotted, "shows a north-south cline" is apparently based on a misinterpretation. Detection of clinal variation from such a figure would involve knowledge of the locality from which each specimen plotted was obtained. This information was not presented in the figure, which was included merely to show the tendency of the two subspecies to differ in this character. It appears that Mr. Freeman equates intermediacy of intergradient populations with clinal variation. Aside from the fact that clinal variation is often exemplified within a zone of intergradation, the phenomena are fundamentally different. Furthermore, the presence of clinal variation within a zone of intergradation neither indicates nor implies that this type of variation characterizes other populations of the species.

He further states that because the populations "are sympatric" and because of "extensive areas" of intergradation "it seems improbable" that subspecies have developed. Several conspicuous flaws are

evident in this kind of reasoning. First, sympatry, which implies genetic interchange in this case, in no way negates the fact that differential selective pressures can result in and maintain subspecifically distinct populations. Second, the extent of an area of intergradation is not directly related to the distinctness of the intergrading populations. If Mr. Freeman means that he would prefer that subspecies separated by extensive zones of intergradation not be recognized as such, it is certainly his right to hold this view. If, on the other hand, as it seems, he is implying that natural selection cannot result in such a pattern, then his ideas of evolutionary processes are, at best, unorthodox. As a point of fact, in this case the area of intergradation is not "many times greater than the range of the proposed subspecies," unless one erroneously calculates the latter merely by measuring the linear north-south distance from the upper to the lower end of the Mobile Bay drainage delta. The multiplicity of branching and anastomosing rivers, and the lakes interspersed among them, provide a total habitable area for delticola that is perhaps as great as that in the area of intergradation.

Our intent in this paper was to describe a subspecies, and in so doing to draw attention to the most obvious and significant kinds of variation occurring within the species and the geographical pattern that they form. The paper was not intended to be a comprehensive analysis of intraspecific variation, nor did we consider it necessary to adopt a didactic approach by belaboring obvious conclusions or dwelling on apparent inferences.

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[Received 27 May 1970.]

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A comment on: THE ECONOMICS OF HERPETOLOGICAL PUBLICATION. By Herndon G. Dowling. 1970. Herpetol. Rev. 2(1): 4-5. --- Your interesting analysis of the economics of publication deserves further attention. Based on my experience as a journal editor, the estimates provided in Table 1 are, if anything, too low.

If one regards the reviewing mechanism as a teaching process, then the cost of acceptable vs. unacceptable manuscripts is quite the reverse of your figures. In six years of editing a broad spectrum biological journal, publishing 80-90 papers averaging 12 pages each annually, less than 5% of the manuscripts submitted required no revision of any sort. The bulk of editorial time was spent on the manuscripts intermediate between those clearly acceptable and those clearly unacceptable.

If you believe, as I do, that a rejected manuscript should be accompanied by a clear statement as to why it is unacceptable (the teaching process), then costs of rejecting at least equal, but generally exceed, those of accepting a manuscript.

In a journal published by a society depending on "hidden" subsidy, the membership ought to submit at least letter-perfect manuscripts. Even if an author cannot write clearly and concisely (improvement of clarity and conciseness requires the bulk of editorial time), he can read the manuscript one more time to correct spelling, typographical errors and check the literature citation section against the text, thus saving some of the "hidden" cost at the editorial level.

Further, it is important to point out that cost of primary publication represents only one data point in the total cost of printed scientific communication.

To costs of primary publication must be added those of secondary services (title announcement, indexing and abstracting services or journals), reprint exchange and library operations. For a generation brought up on the concept that scientific information was free, it comes as a rude awakening that each dollar paid in the form of dues is really an "information dollar" and covers only a fraction of the total cost of printed information transfer.

Finally, for the average American herpetologist, "hidden" and open subsidies at the primary level must be multiplied by 3 to obtain a better first approximation of printed communication. One wonders how long he will continue to pay his information dollars to minimally three societies when the same (or perhaps less) total money put into one organization could yield considerably more units of information/dollar than is now received.

ROBERT E. GORDON
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Notre Dame, Indiana 46556

[Received 22 May 1970.]

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A COMMENT ON THE STATE OF HERPETOLOGY: 1970. --- Herpetology is not a large field. However, its workers are not united in one professional society. Even in the United States there are three national herpetological societies, not counting such newcomer semi-popular societies as the INTERNATIONAL TURTLE AND TORTOISE SOCIETY and the INTERNATIONAL CROCODILIAN SOCIETY. Local organizations, such as the PHILADELPHIA HERPETOLOGICAL SOCIETY, CONNECTICUT HERPETOLOGICAL SOCIETY, the METROPOLITAN NEW YORK HERPETOLOGICAL SOCIETY and the LONG ISLAND HERPETOLOGICAL SOCIETY separate the total membership even more. Foreign societies in Africa, Europe, and Australia divide the field overseas as well. On the one hand, a profession is what its main professional organization does. On the other hand, the largest and oldest society, the AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, is so badly split (between ichthyologists and herpetologists) that it

is surely inadequate to meet the needs of either of the professions which it represents.

Although the ASIH is only one of the many academic organizations to which a herpetologist might or does belong, its strength must derive from its success in satisfying scholarly interests in our field.

On the national level, only SSAR and ITTS provide a "Letters" section as a forum for the exchange of ideas and information. Hopefully this will be available to a much larger audience than just members of this society. I feel that only a national society can and will lead to unification and meaningful direction. Even if one single society of herpetologists cannot come about just yet, there are some things we can and must do now. What are some urgent, new activities?

1. The official journals of the main organizations must publish more material that reflects the "relevant" or "practical" or "timely" activities of an increasing number of members. Our "image" is projected to the undergraduate and graduate students who glance at the journals while they are deciding (a) whether to enter the profession, and (b) what role to play inside or outside of it. Our most prestigious journal, COPEIA, fails to project the kind of image I am talking about. Its scope is becoming narrower and narrower on the one hand, while it is far too broad on the other. In other words, while the articles are narrow in scope and the journal suits itself to thinly spread and isolated interests, the journal reaches not the members of one profession, but of two -- ichthyologists as well as herpetologists. To continue to pretend that both halves of this journal interest all its readers is to ignore the status of two disciplines and, it seems to me, to ignore the needs of the majority of the members of two professions. Furthermore, the publication of COPEIA in its present form is wasteful, since every one of us is paying for something he doesn't need. We could save both time and money by publishing fascicles -- herpetology for the herpetologists, if you wish -- with each member getting as much of the journal as he needs. In addition, since COPEIA is still the major organ of our profession, it would make some sense to widen its scope in keeping with the role which it plays and which it ought to play.

2. With university facilities and cooperation, we should produce tapes and videotapes for both NET and other networks, frankly using all the imagination we insist we possess to excite the general public about our work. We should produce pilot programs as suggestions and models for small radio stations. We ought not to be afraid to publicize ourselves, perhaps even to undertake projects of popularization.

3. A scholarly organization must give emphatic sanction and repeated encouragement to legitimate activities that are now too often regarded as admirable and altruistic but not exactly "professional" and certainly not scholarly: editing our journals and catalogue accounts, activities in conservation or acting as advisors to amateur societies. Perhaps we need a number of symbols in membership directories to identify people who have experience or expertise in these special and often unrecognized kinds of activities.

4. Our other "image" is projected at business meetings held at annual meetings. Any important vote -- on resolutions and top officers -- should be held by mail ballot of the entire membership. It is generally agreed that younger members should have a significant place in a professional society. Few can agree on what that place might be. I think our role should be a more active one. Future members of our societies are and will be recruited from the lines of the amateur societies and undergraduate students. The youth's interest can be aroused by a good teacher or a good course. I am not proposing that the society deal with pedagogy, but it should set up guidelines and prepare materials for undergraduate courses.

All of this is a mere start, if even that -- a few desirables that might edge existing organizations closer to the actual wishes and legitimate interests of an increasing number of their members, with perhaps the by-product of enhancing their image in the eyes of justly cynical observers. No violation of academic freedom -- the freedom of the individual member to decide for himself how to use his time, talents, and energy -- is involved.

Let us dream together about a society which directs its primary efforts not only toward providing a forum for scholarly exchange at national and regional meetings and through appropriate publications, but also to meeting the needs and desires of the individual member through such things as information retrieval programs, perhaps an abstract project (the new policy of printing abstracts in HERPETOLOGICA is a positive one) and a voice in research, conservation and education. We should examine ourselves, as individuals and as members of the profession, from the point of view of the historian in some future generation who will be passing judgment upon us, our awareness, and our actions.

I. GILBOA

217 East Seventh Street
Brooklyn, N.Y. 11218

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HERPETOLOGICAL* SOCIETIES
AMATEUR & PROFESSIONAL

H. G. Dowling & Itzchak Gilboa

If we assume that anyone who is interested in amphibians and reptiles is a herpetologist (and this is a common definition), then there must be thousands of such persons scattered about the globe. Even if we restrict the definition to those who are interested in the scientific study of these animals, there are many hundreds.

These "herpetologists" live in hundreds of different places and work on dozens of different aspects of the biology of amphibians and reptiles. The diverse interests are reflected in part by the thirty or more herpetological societies. Many of the physiologists, anatomists, cytologists, or ecologists that work on amphibians or reptiles, however, do not consider themselves herpetologists at all, and do not belong to any of the societies.

Nevertheless, these societies are extremely diverse in their interests and memberships, and most of them (including the "professional" societies) are open to anyone interested. Only a few (e.g., the African and Canadian societies) have restrictions on membership based on geography or age.

Some of the societies are made up mainly of people without professional training -- amateurs -- whereas others have a large percentage of trained zoologists. However, there is no sharp division between the memberships of amateur and professional societies. Many members of the ASIH, the oldest and largest of the "professional" societies, are high school or college students. Similarly, members of many "amateur" societies also belong to professional groups.

Under these conditions of overlapping memberships (and no one knows just how much overlap there is), it is surprising how little society-to-society contact there is. Only the SSAR, to our knowledge, has, "to achieve closer cooperation and understanding between amateur and professional herpetologists" as one of its stated objectives (Constitution, Art. 2, Sect. 3).

In pursuance of this objective, in June we sent out questionnaires to all of the herpetological societies and clubs that we could locate. A number of these have been filled-out and returned. Others were returned by the Post Office with "Address Unknown," or from some former member who stated that the organization was no longer in existence. At least sixteen such societies have disappeared in the last decade. Our list is still not complete, we are sure, but we publish it here (Table) as a step in finding out more about the societies, and to let SSAR members know something of the diverse offerings.

Some of the organizations are interested in only one group of animals (the Salamander Society, the Crocodilian Society); others are just local clubs where people get together for field trips, or to swap snakes or snake stories. Only a few (and this includes the "professional societies") have objectives that are explicitly defined -- and even fewer have specifically-outlined programs for attaining these objectives. Some do: state surveys, conservation, etc., but often "to increase knowledge of amphibians and reptiles" is the only statement.

The lack of specific objectives and programs has undoubtedly been a major factor in the decline and disappearance of some of the societies. Perhaps an even more prevalent factor is the fragile nature of the leadership in a small society. Often it is held together by an even smaller group of active individuals (sometimes a single individual). When such a person moves or becomes unavailable for some other reason, the society may die in spite of a reasonably-large membership.

We feel that the larger and more professional societies have much to offer the smaller ones in terms of leadership and organizational matters. On the other hand, the amateur societies often have led in conservation efforts and in educational programs -- aspects of herpetology often neglected by the professionals. We hope that the mere knowledge of one another's existence will provide some basis for an improvement in communication between these diverse groups.

SOCIETY NAME AND ADDRESS	PUBLICATIONS	MEMBERSHIP	DUES
American Society of Ichthyologists and Herpetologists Division of Reptiles and Amphibians U. S. National Museum Washington, D.C. 20560 REMARKS: Founded in 1913.	COPEIA [4/year]	Regular Student Foreign Sustaining Honorary	$ 10.00 8.00 8.00 25.00
Asociacion Latino-Americana de Ictiologos y Herpetologos Secretatia Provisional Instituto Nacional de Microbiologia Avda. Velez Sarsfield 563 Buenos Aires, Argentina, South America	ALAIH (mimeo) [irreg]	Student Regular Sustaining	$ 1.00 3.00 10.00
Australian Society of Herpetologists G. F. Watson Dept. of Zoology Univ. of Melbourne Parkville, Vic., 3052 Australia REMARKS: Founded in 1964. New members proposed by 2 financial members.	NEWSLETTER [2/year]	Ordinary 59 Honorary 1	$ A2.00
British Herpetological Society Secretary, BHS c/o Zoological Society of London London, N.W. 1, England	BRITISH JOURNAL OF HERPETOLOGY [1948-date]	650	$ 4.00
California Turtle & Tortoise Society P.O. Box 90573 Los Angeles, Calif. 90045	TORTUGA GAZETTE		$ 5.00
Canadian Amphibian & Reptile Conservation Society c/o Miss Barbara Froom 8 Preston Place Toronto 12, Ontario, Canada REMARKS: Founded in 1960 to protect endangered Canadian species. Minimum age 16.	CARCS BULLETIN [Bi-mon] Pamphlets for public distribution.	Canadian 107 American 8	$ 2.00 2.00
Chicago Herpetological Society Mrs. Hedda Saltz 7351 N. Winchester Chicago, Illinois 60626	BULLETIN CHS	Individual Family Junior Corresponding Institutional	$ 7.50 10.00 5.00 2.50 5.00
Connecticut Herpetological Society c/o George T. Vesper Bakos Road, RFD #2 Tolland, Connecticut 06084	BULLETIN	Regular adult Family Student Sustaining Contributing Life	$ 5.00 7.50 3.00 10.00 25.00 100.00
Deutsche Gesellschaft fur Herpetologie und Terrarienkunde Pres. Konrad Klemmer Senckenberg Museum Senckenberg-Anlage 25 6000 Frankfurt am Main 1, Germany REMARKS: Founded in 1965. Application fee of DM2 is required. Started in 1918 as Vereinigung der Terrarienfreunde.	SALAMANDRA [irreg] NEWSLETTER SALAMANDER [1918-1964, irreg]		DM20
Florida West Coast Herpetology and Conservation Society c/o Robert W. Marek 3027 Pine Tree Ave. Largo, Fla. 33540 REMARKS: Founded in 1969.		Active 25	$ 10.00
Free State Herpetological Society E. Clyde Prince, V.P. Box 285, Carter Lane Elvaton Millersville, Md. 21108	COLLECTING BAG		
German Salamander Society Dr. Walter Sachs, President Angerstrasse 8 Buchloe (Allgau), West Germany	REPORTS		

SOCIETY NAME AND ADDRESS	PUBLICATIONS	MEMBERSHIP	DUES
Herpetological Association of Africa Secretary-Treasurer c/o Umtali Museum Umtali, Southern Rhodesia	THE JOURNAL OF THE HERPETOLOGICAL ASSOCIATION OF AFRICA [1965-date] THE JOURNAL OF THE HERPETOLOGICAL ASSOCIATION OF RHODESIA [1957-65]	Member(Residents) Assoc. Member	$ 2.00 2.00
Herpetological Society of Japan Biological Laboratory Aoyama Gakuin University Shibuyaku, Tokyo, Japan	ACTA HERPETOLOGICA JAPONICA [irreg]	99±	
Herpetologists' League Department of Biological Sciences Southwestern State College Weatherford, Oklahoma 73096	HERPETOLOGICA [4/year]	Membership 1200 Institutional Fellows	$ 5.00 8.00 6.00
International Crocodilian Society P.O. Box 217 Silver Spring, Fla. 32688 REMARKS: Founded in 1968.	NEWSLETTER [REPRINTS]	Charter Mem 100 Regular 8 Life 1 Honorary 8	[closed] $ 9.00 500.00
International Turtle & Tortoise Society, Inc. P.O. Box 45555 Los Angeles, Calif. 90045	INTERNATIONAL TURTLE TORTOISE SOCIETY JOURNAL	U.S. Canada & Mexico Foreign	$ 7.40 7.90 9.50
Long Island Herpetological and and Ornithological Society Frederick C. Schlauch, Editor 415 Clift Street Central Islip, L.I., N.Y. 11722	ENGELHARDTIA [1968-date]	Regular Sustaining Contributing Supporting Corresponding	$ 5.00 8.00 15.00 25.00 4.00
Maryland Herpetological Society Nat. Hist. Soc. of Maryland 2643 North Charles St. Baltimore, Md. 21218 REMARKS: Founded in 1965. Senior membership includes membership in Nat. Hist. Soc. Md.	BULLETIN MARYLAND HERPETOLOGICAL SOCIETY [irreg] NEWSLETTER [4/year]	Senior 24 Junior 16 Subscribing 84	$ 10.00 6.00 3.00
New York Herpetological Society P.O. Box 3946, Grand Central Sta. New York, N.Y. 10017	REPHIBIA [1942-61] HERPETOLOGICAL DIGEST [1961-62] HERP [1963-] NEWSLETTER [irreg]	Regular 375 Corresp./Inst. Contributing Supporting Family	$ 6.00 5.00 10.00 15.00 1.50
Nederlandse Verenigung voor Herpetologie en Terrariumkunde Sect. R. M. Meijer Zonnestein 119 Amstelveen, Netherlands	LACERTA [10/year]	Member 1,633 Junior	DF20.00 14.00
Philadelphia Herpetological Society 130 East Street Road Johnsville, Warminster Pennsylvania 18974	PHS BULLETIN NEWSLETTER	Adult 250± Minor	$ 3.00 2.00
Philadelphia Turtle & Tortoise Club Steven R. Schwartz 7940 Temple Rd. Philadelphia, Pa. 19150			
Savannah Science Museum Herpetology Club c/o Gerald K. Williamson, Curator Savannah Science Museum 4405 Paulsen Street Savannah, Georgia 31405 REMARKS: Continuation of Georgian Herpetology Club, founded in 1960.		Active 30	$ 6.00
Scandinavian Herpetological Society Treas. Kjeld Lundsted Gunløgsgade 62 Copenhagen 5, Denmark	BULLETIN [6/year] [1957-]	215	20 crowns
Society for the Study of Amphibians and Reptiles c/o Joseph T. Collins Museum of Natural History University of Kansas Lawrence, Kansas 66044	JOURNAL OF HERPETOLOGY HERPETOLOGICAL REVIEW FACSIMILE REPRINTS	Regular Sustaining Contributing Life	$ 6.00 8.00 15.00 100.00

SOCIETY NAME AND ADDRESS	PUBLICATIONS	MEMBERSHIP	DUES
South Florida Herpetological Society Ed Chapman 3490 W. 1st Avenue Hialeah, Fla. 33012	BULLETIN [1965-?]		
Southwestern Herpetologists' Society 8427 Farralone Avenue Canoga Park, Calif. 91304 REMARKS: Commercial members also donate 10% of the income from the sales at the meetings.	HERPETON [irreg] HERPETOLOGY [irreg]	Regular 200 Commercial	$ 5.00 5.00
Springfield Herpetological Society Randolph Dietz 2540 Edgewater Springfield, Mo. 25804			
Tennessee Herpetological Society Howard Lawler, Pres. 1505 Acklen Ave. Nashville, Tenn. 37212	BULLETIN	Participating Subscribing	$ 5.00 3.00
Texas Herpetological Society David Gyure, Sec. Canyon High School New Braunfels, Texas 78130	NEWSLETTER	90	
Virginia Herpetological Society 4706 Tallahassee Avenue Rockville, Maryland 20853 REMARKS: Founded in 1958.	VHS BULLETIN	Regular 250 Out of state	$ 2.00 2.00

The Eggomaniacs

Strange doings at Britain's Carr Mill Junior School. The school's headmaster, Douglas Appleton, was recently seen clambering to the top of the local fire department's tallest ladder. From this shaky perch, he began tossing eggs down onto the school's lawn, seventy feet below.

Had the good headmaster gone a bit dotty, like the aristocratic oddballs whose antics enliven P. G. Wodehouse novels? Not at all: In pelting the lawn with eggs, Mr. Appleton was merely reaffirming the British tradition that says amateurs sometimes have a thing or two to tell the experts.

The egg-pitching episode got under way, as *Time* magazine tells the story, when Headmaster Appleton was lecturing his science students on the remarkable shape and structure that give the fragile-looking egg its toughness and resiliency.

To bring his point home, Appleton tossed a number of eggs out a second-floor school window. When they landed on the greensward below, only a few broke open. Noting the "intense interest and wonderment" this demonstration produced among his students, Appleton tried an even bolder eggsperiment. He groped his way to the top of the fire ladder and dropped ten eggs. Seven of them landed unscathed in front of the astonished students, who had formed a semicircle at a respectful distance from the splashdown point.

Headmaster Appleton then got a helicopter pilot to drop eighteen eggs on the school's playing fields, from 150 feet up. No less than fifteen eggs rebounded from the turf stubbornly intact.

Soon word got out, and other British schools began to run torture tests on eggs. Realizing that the game was afoot, the British *Daily Mail* promptly paid a well-known cricket bowler to send eggs skimming across the green between two cricket posts, at ninety miles an hour. When the eggs stopped bouncing along the grass, six out of ten were still whole.

Nothing loath, the rival *Daily Express* chartered a light plane, which jettisoned five dozen eggs while flying low, at 150 miles an hour, across a field near the Carr Mill School. Again, fully 60 per cent of the hen-fruit survived the skip-bombing.

When the eggomania subsided, it left many a scientist muttering over his slide rule and revising his notions about the common egg's uncommon durability. The nation-wide egg craze also left in its wake hundreds, perhaps thousands, of British youngsters who, their interest awakened by the episode, may someday become serious amateur scientists or even professionals.

Britain has, of course, long been a land aswarm with Appleton-style amateurs. Working alone or through amateur societies, they grind telescope mirrors, peer through microscopes, bone up on exotic languages, and in general serve the professional communities as a friendly auxiliary force.

Occasionally, gifted amateurs even outdo the professionals.

The classic case is that of Michael Ventris, a British architect and language hobbyist. In 1956, when he was in his mid-thirties, Ventris staggered the world's archeologists by translating hitherto undecipherable inscriptions left by the ancient Minoans. "Some of us," a professional archeologist commented dryly, "have derived great pleasure from the fact that the deciphering was done by an amateur, not a member of the union at all."

By coptrast, amateur groups in the United States are on the anemic side, and our amateurs generally work in the shadows. How many Americans have heard of Grote Reber, the Wheaton, Illinois, amateur who in 1937 used odds and ends to build the world's first working radio telescope? Yet a teenager, Kaoru Ikeya, became a minor national hero in Japan when, in 1963, he discovered a major new comet, using a homemade telescope built at a cost of $20.

Why doesn't the United States have a vigorous amateur movement in the humanities, social sciences, and natural sciences? Perhaps because amateurs think professionals have no use for them, and professionals hardly know that there *are* any amateurs.

Yet, Yale biologist Edmund Sinnott said a decade ago that science alone needs ten million amateurs, to do team work under the direction of pros and to serve as a human bridge between scientists and laymen. Astronomers have long depended heavily on reports from thousands of organized volunteers who monitor stars, meteors, fireballs, and the planets. Other amateurs do valuable work in weather-watching, archeology, and oceanography.

Overall, though, our amateur movement remains puerile and lackluster alongside Britain's. In a time when people are bewailing the alienation of youth and of blue-collar workers, it is unfortunate that the United States does not have millions of enthusiastic amateurs working with top men in all the professions and disciplines. Such a movement might well, in its own small way, help knit together our badly raveled society.

What would happen if the government or a major foundation encouraged the emergence of a wide-ranging U.S. amateur movement? The very idea of moon-watchers in the slums and amateur archeologists among the grape-pickers will strike some people as hilariously visionary. But if an ordinary egg can (as Headmaster Appleton has shown us) survive a free fall from 150 feet up, what miracles may we not hope for from sentient human beings?

—HALLOWELL BOWSER.

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The editorial by Hallowell Bowser, General Editor of SATURDAY REVIEW, appeared while this article was in preparation. It says some things much better than we can, and we wish to thank Mr. Bowser and the publisher for permission to use it here.

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The varying roles of amateur and professional societies have not yet been formulated in herpetology. We invite comments on these as well as additions and corrections to the data presented in the table.

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AMPHIBIANS AND REPTILES PROTECTED IN PANAMA

The Republic of Panama provided nominal protection for one kind of amphibian and two species of reptiles, among other animals, in a decree dated January 30, 1967. The tortuga verde, or green sea turtle (Chelonia mydas), and the rana dorada, or Panamanian golden frog (Atelopus zeteki), are to receive absolute protection from slaughter or capture, with fines equivalent to U.S. $50.00 and $5.00, respectively, for each infraction. The iguana (Iguana iguana), which is eaten by most ethnic groups in Panama, can no longer be hunted for commercial purposes and cannot be taken even for personal use during the period of December 1 to May 1, which corresponds to the dry season in most parts of the republic. This is the period when iguanas nest and when populations of these large lizards normally receive maximum pressure from hunters. A protein-starved Indian, or a slash-and-burn farmer with a family to feed, is unlikely to pay much attention to the legal protection afforded green turtles and iguanas, even if he understood the rationale and need for such laws. Nevertheless, the establishment in Panama of a National Commission for the Protection of Wildlife is an important step for the conservation of the natural resources of that country.

The golden frog, which is perhaps best considered a subspecies of Atelopus varius, is in particular need of protection. It seems to be confined to the volcanic uplift of the El Valle-Cerro Campana region, part of which is a resort area, and the living frogs are bought as terrarium pets by tourists from Panama City and the Canal Zone. The golden frog's appeal stems not only from its bright color, but also from its being associated in the public mind with the pre-Columbian frogs of real gold that are still being dug from Indian graves in western Panama. The golden frog has been almost extirpated in the crater of El Valle, the type locality, but the real threat is not so much from the relatively small tourist trade as from commercial exploitation of a larger nature --- I have learned of one recent shipment to the United States of approximately 600 specimens, in clear violation of the Panamanian law. Matters should be helped by a new U.S. Federal law, effective August 3, 1970, that prohibits importation of animals from countries where they are protected.

Crocodilians are not mentioned in the Panamanian decree, and neither of the two native species (Crocodylus acutus and Caiman crocodilus fuscus) is on the new "United States List of Endangered Foreign Fish and Wildlife." However, there is a sort of crocodilian preserve in the Territory of San Blas and part of adjacent Darien Province, where at least some groups of Cuna Indians will impose their own fines for the killing of such religiously important animals. Although not seriously endangered in Panama at this time, the crocodile can nonetheless use such protection, as it occurs principally in the larger bodies of water and nowhere seems really abundant. Fortunately there is no large-scale hide industry in Panama, and a flurry of recent laws in the United States and elsewhere makes it unlikely that one will develop. Caimans are abundant in Panama and are hardly likely to be endangered in the foreseeable future, unless the farmers and Indians discover that they are overlooking a tasty source of protein.

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AVISO AL PUBLICO



EL DECRETO Nº 23 DE 30 DE ENERO DE 1967. SOBRE PROTECCION A LA FAUNA SILVESTRE. EN SU ARTICULO 2º. CON EL PROPOSITO DE PROTEGER PARCIALMENTE A LA IGUANA. PROHIBE SU CAZA CON FINES COMERCIALES Y ESTABLECE UNA EPOCA DE VEDA A PARTIR DEL 1º DE DICIEMBRE DE CADA AÑO HASTA EL 1º DE MAYO DEL AÑO SIGUIENTE.

EN CONSECUENCIA. LOS ALCALDES CORREGIDORES. REGIDORES. COMISARIOS. GUARDIA NACIONAL Y LOS MIEMBROS DE LAS COMISIONES DE PROTECCION DE LA FAUNA SILVESTRE. PROCEDERAN A DECOMISAR TODAS LAS IGUANAS VIVAS EN VENTA. SEA CUALQUIERA EL LUGAR DONDE SE ENCUEN_ TRAN. DURANTE ESTA EPOCA.

COMISION NACIONAL DE PROTECCION DE LA FAUNA SILVESTRE.

Panamanian poster that prohibits hunting of iguanas for commercial reasons and which imposes a closed season from December 1 to May 1.

CURRENT HERPETOLOGICAL TITLES, XI: 1969 - 1970

Herpetological Information Search Systems
American Museum of Natural History
New York, N. Y. 10024

In the last two and a half years we brought to your attention some 11,000 current titles in the pages of this journal.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts-Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses especially.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of some interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any paper that is concerned with a member of a Recent order of amphibians or reptiles.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This eleventh list contains titles of books and articles that have come to our attention during the period 1 May 1970 through 20 July 1970. The list is divided into two separate, alphabetically arranged sections: one for titles published in 1969, and one for titles published in 1970.

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and T. Shaman. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. Dr. Robert W. Winter provided us with translations of titles, abstracts and papersz from Slavic languages. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need, however, and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 21 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

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OFFERS:

ORIGINAL DESCRIPTIONS of ANY amphibian or reptile (microfilm or xerox). $2 each.

DRAWINGS of snake skulls, maxillaries, vertebrae, hemipenes, etc. More than 400 originals on hand. We will also prepare certain drawings at less than cost. $5 - $10 for one-time use.

CURRENT HERPETOLOGICAL TITLES on Library Cards (for departmental use). About one-third have abstracts: 1968, 1969, subscription for 1970 (3,000 - 4,000 cards per year). $200 each year.

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ACAD ROY BELG CL SCI COLLECT OCTAVO MEM 38(4)
ACTA ANAT 74(2)
ACTA BIOL ACAD SCI HUNG 20(4)
ACTA BIOL MED GER 22(2-4)
ACTA CIENT VENEZ 20(1-2)
ACTA ENDOCRINOL 64(2)
ACTA HERPETOL JAP 3(2-3) (4)
ACTA HISTOCHEM 33(1) (3)
ACTA PARASITOL POL 16(27)
ACTA ZOOL (STOCKHOLM) 50(3)
AFR WILDLIFE 24(1)
AFRICA-TERVUREN 15(4)
AFRICANA 3(12)
AGR BIOL CHEM 33(10)
AKAD NAUK AZERB SSR IZV SER BIOL NAUK (4)
AMER FIRST ZOO 22(1)
AMER J PHARM 141(3)
AMER J PHYSIOL 218(1) (2) (4) (5)
AMER MIDLAND NATUR 82(1), 83(1) (2)
AMER MUS NOVITATES (2424)
AMER NATUR 104(935)
AMER SCI 58(3)
AMER ZOOL 10(1)
ANAL BIOCHEM 32(3)
ANAT ANZ 125, 126(3)
ANAT REC 163(2), 166(3) (4), 167(1)
ANCHOR 4(4)
ANIM BEHAV 17(3) (4)
ANIM KINGDOM 72(6), 73(1) (2)
ANIMALAND 37(1)
ANN EMBRYOL MORPHOG 2(1)
ANN ENTOMOL SOC AMER 63(2)
ANN FAC SCI CAMEROUN 1969(3)
ANN INST BIOL (TIHANY) HUNG ACAD SCI 36
ANN NATAL MUS 20(2)
ANN MUS CIVICO STORIA NAT GIACOMO DORIA 77
ANN PARASITOL HUM COMP 44(5)
ANN SCI UNIV BESANCON GEOL 3 ser(8)
ANN ZOOL 27(17)
ANNEE BIOL 9(3-4)
ANNU MEET S CALIF ACAD SCI 1970
ANNU MEET SOC STUD AMPHIBIANS REPTILES 1969
ANNU REP DEP AGR STOCK FISH PAPUA NEW GUINEA 1966-1967
ANNU REP SENECA PARK ZOO 1969
ANNU REV PHYSIOL 32
AQUA TERRA 7(1) (3) (4) (5) (6)
AQUAR MAG 4(3) (4) (5)
AQUAR TERR 16(4), 17(2) (3)
AQUARIEN TERRARIEN Z 23(3) (4) (5)
AQUARIST AND PONDKEEPER 34(12), 35(2) (3)
ARCH ANAT HISTOL EMBRYOL 52(1-4) (5-8)
ARCH BIOL (LIEGE) 80(4)
ARCH ENVIRON HEALTH 19(6)
ARCH INT PHARMACODYN THER 179(1), 180(1)
ARCH ITAL BIOL 108(1)
ARCH ORAL BIOL 14(11)
ARCH PHARMAKOL EXP PATHOL (NAUNYN-SCHMIEDEBERGS) 263(1)
ARCH SCI PHYSIOL 23(3)
ARCH SOC BIOL MONTEVIDEO 27
ARDEA 57(3-4)
ASB BULL 17(2)
ATAS SOC BIOL RIO DE JANEIRO 12(suppl), 13(1-2)
ATTI ACCAD NAZ LINCEI MEM SER VIII 9(2)
ATTI ACCAD NAZ LINCEI REND 46(6)
AUDUBON MAG 72(2)
AUST J EXP BIOL MED SCI 47(6)
AUST NATUR HIST 16(9)
BEHAVIOUR 36(3)
BETES NATURE (70)
BIBL ANAT (10)
BIOCHEM BIOPHYS RES COMMUN 38(3), 39(4)
BIOCHIM BIOPHYS ACTA 197(2), 198(2), 203(1) (3), 204(2), 206(1)
BIOL BULL (WOODS HOLE) 138(2)
BIOL GABONICA 5(3)
BIOL J LINN SOC 2(1)
BIOPHYS J 10(3) (4) (5)
BIOSCIENCE 20(9)
BLIJDORP GELUIDEN 18(5)
BOL REAL SOC ESPAN HIST NATUR SECC BIOL 66(3-4)
BOLL SOC ITAL BIOL SPER 45(13) (14)
BRAIN RES 18(2) (3), 19(1)
BREVIORA (337) (341) (346) (348) (349)
BRIT J PHARMACOL 37(3), 38(2)
BROOKHAVEN SYMP BIOL (21)
BULL ACAD SERBE SCI CL SCI MATH NATUR 46(12)
BULL BIOL FR BELG 104(1)
BULL BIOL RES CENT 4
BULL CENT MAR FISH RES INST (13)
BULL CHICAGO HERPETOL SOC 4(2), 5(1)
BULL FLA STATE MUS BIOL SER 15(1)
BULL GA ACAD SCI 27(2), 28(2)
BULL GEOL INST UNIV UPPSALA 1(1-6)
BULL INST FOND AFR NOIRE (A) 31(4)
BULL MD HERPETOL SOC 5(4), 6(1)
BULL MUS COMP ZOOL HARVARD UNIV 139(2) (3) (5) (6)
BULL MUS NAT HIST NATUR PARIS 41(4)
BULL NAT SPELEOL SOC 31(2)
BULL OKLA ANTHROPOL SOC 18
BULL S C ACAD SCI 31
BULL S CALIF ACAD SCI 68(3)
BULL SOC FRIB SCI NATUR 58(1) (3)
BULL SOC ROY NATUR MONS BORINAGE 52(1-3)
BULL SOC SCI NATUR PHYS MAROC 48(3-4)
C R ACAD SCI (PARIS) D 269(19) (20) (22) (25), 270(5) (8) (9) (10) (13) (18) (19)
C R SEANCES SOC BIOGEOGR (395-403)
C R SEANCES SOC BIOL FILIALES 163(10) (11)
CALDASIA 10(48)
CALIF FISH GAME 56(2)
CAN J EARTH SCI 7(2)
CAN J PHYSIOL PHARMACOL 48(5)
CARIBBEAN J SCI 9(3-4)
CAT AMER AMPHIBIANS REPTILES 81-90
CAVES AND KARST 11(5)
CHAT 34(1)
CHROMOSOMA 29(2) (3)
CIENC INVEST (BUENOS AIRES) 25(9)
COMP BIOCHEM PHYSIOL 30, 32(2), 33(1) (2) (3) (4), 34(1) (2)
COMUN ZOOL MUS HIST NATUR MONTEVIDEO 10(127)
CONFIN NEUROL 31
CONN HERPETOL SOC BULL 1(1)
CONSERV NEWS, S. E. ASIA (8)
CONSERVATIONIST 24(4)
CONTRIB GEOL UNIV WYO (1)
COPEIA 1970(2)
CYTOGENETICS (BASEL) 9(2) (3)
DESERT 33(6)
DEVELOP BIOL 21(3) (4), 22(1)
DEVELOP GROWTH DIFFER 11(3)
DISCOVERY (NEW HAVEN) 5(2)
DISS ABSTR B 29(9)
DOKL AKAD NAUK SSSR 189(4) (6), 190(3), 191(3)
DRUM AND CROAKER 70(2)
EAST CAPE NATUR (39)
ECOL MONOGR 39
ECOLOGY 50(6)
EESTI LOODUS 13(2), 1970(4)
EKOL POL SER A 17(31) (38)
ENDOKRINOLOGIE 55(3-4)
ENVIRON SOUTHWEST (422)
ERGEB ANAT ENTWINCKL 42(2)
EUR J PHARMACOL 7(2) (3), 9
EVOLUTION 24(1)
EXP BRAIN RES 10(4)
EXP CELL RES 60(1)
EXP EYE RES 8
EXP NEUROL 25(2)
EXPLORERS J 48(1)
EXPERIENTIA (BASEL) 25, 26(2) (3)
EYE EAR NOSE THROAT MON 48
FARMAKOL TOKSIKOL 32(4)
FAUN NOTIZ SAARLAND 2(2)
FAUNA BULL (WEST AUST) 3(4)
FED PROC 29(2) (3)
FEBS LETT 5(1) (3)
FIELD 235(6108) (6113)
FIELD MUS NATUR HIST REP 1967-68
FIELD NOTES MON NEWSLETT ARK ARCHEOL SOC (63)
FIZIOL ZH SSSR IM I M SECHENOVA 56(1) (2) (4)
FLA NATUR 42(1), 43(2A)
FOLIA BIOL (KRAKOW) 17(4)
FOLIA BIOL (PRAHA) 16(1)
FOLIA MORPHOL (PRAGUE) 18(1)
FORD TRUCK TIMES 18(4)
FREUNDE KOELNER ZOO 12(1)
FRONTIERS 34(4)
GEGENBAURS MORPHOL JAHRB 114(2)

GEN COMP ENDOCRINOL 13(3), 14(1) (2)
GENETIKA 5(11)
HERPETOL REV 2(1) (2)
HERPETOLOGICA 26(1)
HISTOCHEMIE 19
HORTICULTURE 48(4)
IAF CONF (18)
IHERINGIA ZOOL (37)
IN VITRO 1969
INDIAN J HELMINTH 21(1)
INST LAB ANIM RES NEWS 13(1)
INT TURTLE TORTOISE SOC J 4(1) (2)
INT ZOO YEARB 9, 10
ISRAEL J ZOOL 18(2-3)
IUCN BULL 2(14)
IUCN PUBL (N.S.) suppl 18
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J ANAT 106(3)
J APPL PHYSIOL 27(6)
J ARIZ ACAD SCI 6(1)
J BIOL PSYCHOL 11(1)
J BOMBAY NATUR HIST SOC 66(1) (2)
J CELL SCI 6(1) (2)
J COMP NEUROL 138(2)
J COMP PHYSIOL PSYCHOL 70(1)
J ELISHA MITCHELL SCI SOC 85(4)
J EMBRYOL EXP MORPHOL 23(2)
J ENDOCRINOL 45(4), 46(1) (4)
J EXP ZOOL 172(1) (4), 173(1) (2) (3), 174(1)
J GEN PHYSIOL 55(3) (5)
J HERED 60(4)
J HERPETOL ASS AFR (6)
J HISTOCHEM CYTOCHEM 18(5)
J MED ENTOMOL 7(1)
J MICROSC 9(1)
J MORPHOL 130(2) (3) (4), 131(1)
J NEUROPHYSIOL 33(3)
J PALEONTOL 44(1)
J PHARM PHARMACOL 21(12)
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J TROP MED HYG 73
J ULTRASTRUCT RES 30(5-6), 31(1-2)
J UNIV BOMBAY 38(65)
J WILDLIFE DIS 6
J ZOOL (LONDON) 160(2)
JAP J PHYSIOL 19(5)
JUSTUS LIEBIGS ANN CHEM 729
KANSAS SCH NATUR 16(4)
KINGFISHER 4(6), 5(1)
KIRTLANDIA (8)
KOSM ISSLED 7
KOSMOS 66(3) (6)
KOSMOS (WARSAW) SER A 19(1)
KUMAMOTO J SCI SER B SECT 2 BIOL 9(2)
KY HAPPY HUNTING GROUND 26(2) (3)
LAB ANIM CARE 19(5)
LACERTA 28(8)
LAFAYETTE NATUR HIST MUS TECH BULL 1
LIFE SCI 9(3)
LIVING MUS 32(1)
LLOYDIA (CINCINNATI) 32(4)
LORIS 11(6)
LOS ANGELES COUNTY MUS CONTRIB SCI (179) (191) (192)
MAINE FIELD NATUR 26(2) (3)
MALAYAN NATURE J 23(1) (2-3)
MAMMAL CHROMOSOMES NEWSLETT 11(2)
MASS AUDUBON 54(3) (4)
MD HERPETOL SOC NEWSLETT 6(1A)
MEM BUR RECH GEOL MINIERES (69)
MEM MUS NAT HIST NATUR PARIS SER A ZOOL 57
MISS GAME FISH 33(1)
MITT ABT ZOOL BOT LANDESMUS JOANNEUM GRAZ 31
MUS GENEVE (N.S.) 11(102)
N HAMPSHIRE AUDUBON QUART 23(2)
N QUEENSLAND NATUR 37(151)
NARRAGANSETT NATUR 11(2)
NASA CONTRACTOR REP (107729)
NATUR BELG 51(1)
NATUR HEIMAT 29(4)
NATUR HIST BULL SIAM SOC 23(1-2)
NATUR UND MUSEUM 99(10)
NATURE (LONDON) 226(5249)
NATUREN 94(1)
NATURFORSCH GES SCHAFFHAUSEN SER 2 (4)
NEBR BIRD REV 38(1)
NEUROSCI RES PROGRAM BULL 7(5)
NEUROSCI TRANSL (9) (11)
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NUESTRA TIERRA (11)
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OKAJIMAS FOLIA ANAT JAP 46(6)
ONCOLOGY (BASEL) 24(1)
OOST WEST 63(1)
ORYX 10(4)
OUTDOOR LIFE 145(3)
OUTDOOR OKLA 26(4)
PA GAME NEWS 41(6)
PAC SCI ASS INFO BULL 22(1-2)
PAKISTAN J SCI 21(1-2)
PAKISTAN J ZOOL 1(2)
PARASITOLOGY 59(1), 60(1)
PETFISH MON 5(1)
PFLUEGERS ARCH EUROPE J PHYSIOL 314(2), 316(1) (2) (3-4), 317(1) (3)
PHARMACOL RES COMMUN 1(1)
PHYSIOL BEHAV 5(1) (5)
PHYSIOL ZOOL 43(1)
PLATEAU QUART MUS N ARIZ 42(4)
POEYANA INST BIOL HABANA SER A (66) (67)
POL AKAD NAUK ZAK PRZY 34
POZNAJ SWIAT 18(4)
PRIRODA (MOSKVA) 1970(3)
PRIRODA (SOFIA) 1969(6)
PROC BIOL SOC WASH 82(58) (60)
PROC CALIF ACAD SCI 37(7) (9) (10)
PROC INDIAN ACAD SCI SECT B 71(3)
PROC JAP ACAD 45(9) (10)
PROC KON NED AKAD WETENSCH SER C BIOL MED SCI 73(2)
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PROC NAT ACAD SCI U S A 64(3), 65(3), 66(1)
PROC ROY SOC QUEENSLAND 80(5)
PROC ROY ZOOL SOC N S W 1968-1969
PROC SOC EXP BIOL MED 132(3), 133(2) (4)
PROTEUS 32
PROTOPLASMA 67(4)
PRZEGL ZOOL 13(4)
PRZYRODA POLSKA 13(4)
PSYCHONOMIC SCI 18(1) (3)
QUART J EXP PHYSIOL COG MED SCI 55(2)
QUART J TAIWAN MUS TAIPEI 22(1-2)
QUART REV BIOL 45(1)
QUART REV BIOPHYS 3(2)
RADIAT RES 41(3), 42(2)
REC S AUST MUS 16(1)
REDSTART 37(1)
REND SEMIN FAC SCI UNIV CAGLIARI suppl 38
RES COMMUN CHEM PATHOL PHARMACOL 1(1)
RES REP HEBREW UNIV 1
RESP PHYSIOL 8(3), 9(1) (2)
REV BIOL (PERUGIA) 62(4)
REV BRASIL BIOL 29(4)
REV FED FRANC SOC SCI NATUR 3 SER 8(37)
REV INST MED TROP SAO PAULO 11(6)
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REV SUISSE ZOOL 76(4)
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SANCTUARY (LONG ISL N Y) 1969(autumn)
SCI AMER 222(6)
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SCIENCE (WASHINGTON) 168(3929) (3931) (3933) (3937) (3938) (3939)
SENCKENBERGIANA BIOL 50(3-4) (5-6)
SITZ OESTERR AKAD WISS MATH NATUR KL ABT I 178(1-4)
SOUTHWEST NATUR 15(1)
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ST. XAVIER'S COLL PALAYAMKOTTAI ANNU 1970
STUTTGARTER BEITR NATURK (197)
SYMP ZOOL SOC LONDON (24)
SYST ZOOL 19(2)
TASMANIAN NATUR (20)
TERATOLOGY 2(2)
TEX PARKS WILDLIFE 28(5)
TIME 8 June 1970, 29 June 1970
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TORTUGA GAZETTE 6(2) (3) (5)
TOXICOL APPL PHARMACOL 16
TOXICON 7(4), 8(1)
TRANS AMER FISH SOC 99(2)
TRANS KANS ACAD SCI 72(1)
TRANS ROY SOC S AUST 93
TRANS ROY SOC TROP MED HYG 63(3)
TRAVEL AND CAMERA 33(6)
TROP FISH HOB 18(172) (10)
TSITOLOGIYA 12(1) (2) (3)
UNIV KANS PUBL MUS NATUR HIST 18(7), 20(1)
UNIV KANS SCI BULL 48(22) (23) (24) (25)
VA HERPETOL SOC BULL (63)
VA J SCI 20(4)
VA(NCOUVER) AQUAR NEWSLETT 14(1) (2)
VERH KON NED AKAD WETENSCH AFD NATUURK TWEEDE REEKS 58(6)
VEROEFF ZOOL STAATSSAMMLUNG (MUNICH) 13
VERTEBRATA HUNGARICA (BUDAPEST) 11(1-2)
VESMIR 48(12)
VESTN CESK SPOLECNOSTI ZOOL 34(1) (2)
VESTN ZOOL 1970(1)
VISION RES 10(2)
VOEGEL HEIMAT 40(6)
WALKABOUT 35(9)
WASMANN J BIOL 27(2)
WEST AUST NATUR 11(5)
WILDLIFE AUST 7(1)
WILDLIFE N C 34(4)
WILDLIFE REV 5(5)
WILHELM ROUX ARCH ENTWICKLUNGSMECH ORGANISMEN 164(4)
WILSON BULL 82(1)
WIS CONSERV BULL 35(2)
WISS FORTSCHR (8)
Z ANAT ENTWICKLUNGSGESCH 130(2)
Z MORPHOL TIERE 66(4)
Z VERGL PHYSIOL 66(1)
Z VERS 12(1-2)
Z ZELLFORSCH 103(2), 104(1) (2) (3) (4), 105(1) (2) (4), 106(1)
Z ZOOL SYST EVOLUTIONSFORSCH 8(1)
ZENTRALBL BAKTERIOL PARASITENK INFEKTIONSKR HYG 210(3)
ZIVA 17(2) (5) (6)
ZOOL AFR 5(1)
ZOOL BEITR N F 15(2-3)
ZOOL GARTEN (NF) 37(1-3) (4-5)
ZOOL LIST CESK 18(1) (2)
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ZOOL SOC LONDON ANNU REP 1969
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BOOK REVIEW

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THE NEW FIELD BOOK OF REPTILES AND AMPHIBIANS. By Doris M. Cochran and Coleman J. Goin. 1970. G. P. Putnam's Sons, New York. xxii + 359 p., 100 black and white figs., 96 color photographs in 16 plates (6 per plate), and 5 unnumbered drawings of anatomical parts of the salamander, frog, turtle, lizard, and snake. $5.95.

This long-awaited field guide has finally appeared and will undoubtedly be very popular amongst professional and amateur herpetologists alike. The organization of the book is simple, beginning with a one-page preface and two-page introduction, and followed by the text, which consists of six main groupings (= orders or suborders): (1) Sirens and Salamanders; (2) Frogs and Toads; (3) Crocodilians, Family Crocodylidae; (4) Turtles; (5) Lizards; and (6) Snakes, in that order. At the introduction for each group, there is a brief discussion of the order or suborder, followed by the family, genus, species, and subspecies accounts, arranged generally in a primitive to advanced sequence. The species and subspecies accounts vary from 2 to 37 lines in length and the following description is an example:

> "Limestone Salamander, Hydromantes brunus (Figure 12).
>
> This species has a longer tail, longer legs, and longer toes than the Mount Lyell Salamander. The tips of the toes overlap when the limbs are adpressed by 1 1/2 intercostal folds. Adults are uniformly brown above, pale below, with yellow on the underside of the tail. Young are pale yellowish-green above. This form is known from the lower Merced Canyon in Mariposa County, California, at altitudes of 1,200 to 2,500 feet."

The book concludes with a list of Selected References and the Index to both scientific and common names combined.

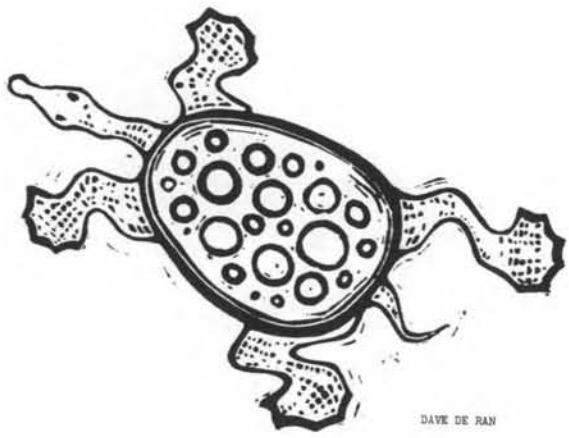
The untimely death of the senior author two years ago and the recent illness of the junior author, probably slowed the appearance of this work. The unfortunate "long term in press" apparently prevented the inclusion of forms described over the past three years as well as changes in classification and nomenclature during this period. For instance, the old classification of Campbell (1931) for Batrachoseps is followed. This was altered considerably by Brame and Murray (1968), including the description of three new forms. Also, the photograph of a Batrachoseps from San Diego County (Fig. 5) is labeled, "California Slender Salamander, Batrachoseps attenuatus," whereas it is clearly B. major, the Garden Slender Salamander. Further, Hyla cadaverina was shown to be an older name for H. californae by Duellman (1968) and species names for Syrrhophus have been revised by Lynch (1970).

Some forms were included that should not have been, viz. subspecies of Leurognathus, as Martof, who had originally described three of the races, later sunk them all in 1962. Conversely, several species are not included that have been described, elevated to species rank from synonymy, or found to occur within the continental USA well in advance of the final preparations of the book, viz. Typhlomolge tridentifera (Mitchell and Reddell, 1965), Ambystoma platineum and A. tremblayi (Uzzell, Copeia, 1964 (2): 257-300), Cnemidophorus flagellicaudus and C. sonorae, described by Lowe and Wright (1964), Rhinophrynus dorsalis reported by James (1966) to occur in southern Texas, and Tantilla oolitica and T. relicta described by Telford (1966).

One can't help comparing this work to the two Peterson Field Guides: "A Field Guide to Reptiles and Amphibians" - Eastern USA by R. Conant (1958) and "A Field Guide to Western Reptiles and Amphibians" by R. C. Stebbins (1966). The Peterson Field Guides contain much more detailed information, illustrations of nearly every species, thorough maps, and detailed descriptions of eachz species, and thus these books are far more useful to the professional or advanced amateur herpetologist. The New Field Book of Reptiles and Amphibians will be of more interest to the layman or beginning amateur herpetologist. Despite its drawbacks, everyone who calls himself a herpetologist should have a copy in his library.

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BOOK REVIEW

THE FROG. By T. A. G. Wells. 1968. [Reprint, 1964 Ed., Heineman Ltd.] Dover Publications, Inc., New York. viii + 44 p., 16 drawings. Paperbound. $1.35.

This manual is a dissection guide for the European frog, Rana temporaria. It has been designed to aid British students in studying for standardized examinations. Included are diagrams and detailed descriptions of the skeleton, vascular system, and nervous system. There are briefer sections on the musculature, visceral organs, external features, and parasites.

With the trend away from dissection for its own sake in American schools (and even Scottish ones), it is unlikely that this book will find a large market here. Many of the drawings are not as realistic as those generally available, and the carry-over from European to the American frogs most often used for dissection here is not complete (the girdles and skull have the same basic elements, but their appearance differs appreciably).

It is likely that this guide would be most helpful to high school and college teachers as a quick reference to frog anatomy. Useful features are the glossary of Greek and Latin roots and the brief exercises on observing living frogs and frog parasites.

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NEW FACSIMILE REPRINTS FROM SSAR

ANATOME TESTUDINIS EUROPAEAE, by L. H. Bojanus. 1819-1821. v+vi+178 p., 40 pl. (folio). Original issue of this classic in turtle anatomy was 80 copies. Reprint has introduction by Alfred S. Romer. PRICES: $13 (paper), $15 (cloth) to Members; $18, $20 to others. Issued February 1970.

TORTOISES, TERRAPINS AND TURTLES, by Sowerby and Lear. 1872. 60 pl. "The finest atlas of turtle illustrations ever produced." The reprint has an introduction by Ernest E. Williams. PRICES: $9 (paper), $10 cloth) to Members; $14, $15 to others. To be issued Fall 1970.

CLASSIFICATION OF LIZARDS, by Charles L. Camp. 1923. "The foundation of modern lizard systematics." Reprint has introduction by Garth Underwood; index. PRICES: $11 (paper), $12 (cloth) to Members; $16, $17 to others. To be issued Winter 1970-1971.

Order from:

HENRI C. SEIBERT, SSAR Publ. Sec.
Department of Zoology
OHIO UNIVERSITY
Athens, Ohio 45701

RECENT RELEASES

A LABORATORY PERSPECTUS OF SNAKE ANATOMY, by J. C. Oldham, H. M. Smith, & S. A. Miller. 1970. Stipes Publ. Co., 10 Chester St., Champaign, Ill. 61820. v + 98 p., ill. $4.75.

BRITISH MAMMALS AND AMPHIBIANS [phonograph record]. BBC Wildlife Series No. 2.

SNAKE BITE: FIRST AID [movie, 11 min., 16 mm. color]. W.L.B. Productions, 25 West 45th Street, New York, N.Y. 10036.

ORGANIZATION AND DEVELOPMENT OF THE EMBRYO, by Ross Granville Harrison, edited by Sally Wilens. 1969. 290 p., "beautiful drawings" of stages of Ambystoma maculatum from life, by Lisbeth Krause. Yale Univ. Press. $15.

BIBLIOGRAPHY OF ANIMAL VENOMS, ENVENOMATIONS, AND TREATMENTS, by G. Rosenfeld & E.M.A. Kelen. 1969. Livraria Nobel S/A, Caixa Postal 2373, Sao Paulo, Brazil. $20.

CONNECTICUT'S VENOMOUS SNAKES: TIMBER RATTLESNAKE AND NORTHERN COPPERHEAD, by Richard C. Peterson. 1970. Bull. State Geol. Natur. Hist. Surv. Connecticut (103): iv + 40 p., 15 fig., 6 col. pl. Order from State Librarian, State Library, Hartford, Conn. 06115. $1.

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UNREVIEWED-UNEDITED COMMUNICATIONS
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MODIFICATIONS OF THE TAYLOR ENZYME METHOD OF CLEARING AND STAINING FOR AMPHIBIANS AND REPTILES

George R. Zug and Ronald I. Crombie

Taylor (1967) developed his clearing and staining method primarily for fish. During the developmental stages, he tested his method on a number of specimens in the herpetological collection of the U.S. National Museum of Natural History and found that although the results were satisfactory they were not ideal. We have recently discovered a number of modifications which greatly improve the quality of cleared and stained amphibians and reptiles. The following steps correspond numerically to those in "The Methods" section of Taylor's article (1967).

1. Specimens may be killed either with a chlorotone solution (amphibians) or Nembutal (reptiles). Specimens are preserved immediately upon death by injecting buffered formalin into the body cavity. We used the concentrated formaldehyde solution (40 per cent formaldehyde) as prepared by the manufacturer. This solution is not diluted, only buffered, i.e., approximately a half a teaspoon of sodium borate per quart of formalin. Although this produces hard and brittle specimens, they are ideal for clearing and staining. Following preservation, the specimens are positioned for fixation in air-tight trays containing a shallow layer of formalin and covered with formalin-dampened paper towels. The limbs and digits should be carefully positioned to facilitate the eventual examination of the specimens. The specimens are allowed to fix for 12 to 24 hours and then transferred to and stored in either concentrated or 4 per cent formalin. We have observed no differences in the final results owing to the concentration of the formalin. To date, we have stored no specimens more than a month.

2. Specimens are washed in several changes of water for two to three days. Specimens are removed from the water and skinned. Since the manner of preservation produces brittle specimens, extreme care is required in skinning to avoid dismembering the appendages. The eyes should not be removed since there are sclerotic ossicles in most reptiles and their pigment is an aid in timing of a following step. The specimens are eviscerated and returned to water for several hours.

3. Reptiles and amphibians have been bleached in a 20 per cent stock hydrogen peroxide and 80 per cent stock potassium hydroxide solution with satisfactory results. The bleaching, buffer, and enzymatic solutions are all exposed to a 75 watt lamp. The bleaching solution is exposed directly to the lamp and maintains a temperature of approximately 30 C.; the enzyme and buffer solutions are at 25-26 C. owing to indirect exposure.

The size of the specimen and the thickness of the muscle masses determine the amount of time in the bleaching solution. The time range is from one day for small anurans, e.g., Limnaeoedus ocularis, to two weeks for larger amphibians and reptiles, e.g., Bufo terrestris or hatchling Kinosternon. Our suggested bleaching time greatly exceeds that of Taylor, since we use this step for clearing as well as for removal of the pigment. Specimens are removed from the bleaching solution when most of the thinner muscle sheets have become transparent, the thicker muscle masses have become translucent, and the eyeballs have lost all their pigmentation.

4. The specimens are placed in a buffer solution. Small, transparent specimens may be transferred directly to the alizarin (step 7) after a short rinse in water.

5. and 6. The specimens are transferred to an enzymatic solution. The specimens should remain in this solution for no more than two or three days and generally much less. If the specimens are exposed for longer periods of time, there is a high probability that phalanges will drop off, even after they have been stored in glycerine. In most instances, a maximum of eight hours is sufficient. With larger specimens, it is advisable to follow this step with a five to six hour wash in 65 per cent ethyl alcohol. This wash has the advantage of halting enzymatic activity and simultaneously hardening the remaining tissue.

7. The specimens are placed in a solution of alizarin red S and stock potassium hydroxide. Penetration of the dye through thick muscle masses is insured by using a blunt probe to separate the muscles. Specimens can usually be removed from this solution after a day; however, inspection of intensity of staining is the best indicator. The alizarin solution should be renewed frequently for good results. As soon as there is a noticeable decrease in the intensity of the stained bones, prepare a new solution.

8. and 9. These steps are omitted, since skinning and evisceration were performed in step 2.

10. and 11. These are optional steps, and we have had no cause to use them.

12. The specimens are transferred to a 40 per cent glycerine and a 60 per cent ethyl alcohol (65 per cent) solution. Initially the specimens will rest on the surface. When they have sunk (approximately 2 to 3 days), they have equilibrated and should be transferred to a 70 per cent glycerine and 30 per cent alcohol solution. After several more days, they can be placed in 100 per cent glycerine. Please note that we have substituted 65 per cent alcohol for distilled water in the glycerine series.

This substitution has resulted in firmer specimens.

SUMMARY

Five modifications of the Taylor enzyme method of clearing and staining are proposed: 1) Preserve the specimens in 40 per cent formalin; 2) skin and eviscerate before bleaching; 3) increase the time of immersion in bleaching solution; 4) decrease the time of immersion in enzymatic solution; 5) replace distilled water with 65 per cent ethyl alcohol in the glycerine series. All these modifications produce a very transparent specimen with a decreased likelihood of specimen disarticulation, particularly of manus and pes.

ACKNOWLEDGEMENTS

We wish to thank Drs. W. R. Taylor and J. A. Peters for their criticism of the manuscript. This work has been supported by a Smithsonian Research Foundation grant to G. R. Zug.

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Division of Reptiles and Amphibians
U.S. NATIONAL MUSEUM OF NATURAL HISTORY
Washington, D.C. 20560

[Received 31 July 1970.]

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RECENT PUBLICATIONS ON SPECIMENS AND DATES OF INTEREST TO HERPETOLOGISTS

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BOESEMAN, M. 1970. The vicissitudes and dispersal of Albertus Seba's zoological specimens. ZOOL MEDED RIJKSMUS NATUUR HIST LEIDEN 44(13):177-206, 1 fig., 4 pl.

BOWLEY, DONOVAN R. and HOBART M. SMITH. 1968. The dates of publication of Louis Agassiz's Nomenclator Zoologicus. J SOC BIBLIOGR NATUR HIST 5(1):35-36.

COWAN, C. F. 1969. Cuvier's regne animal, first edition. J SOC BIBLIOGR NATUR HIST 5(3):219.

_____. 1969. Notes on Griffith's Animal Kingdom of Cuvier (1824-1835). J SOC BIBLIOGR NATUR HIST 5(2):137-140, 1 tab.

HINDWOOD, K. A. 1970. The "Watling" drawings, with incidental notes on the "Lambert" and the "Latham" drawings. PROC ROY ZOOL SOC N S W 1968-1969:16-32, 4 pl.

KEVAN, D. KEITH MCE. 1970. Agassiz's Nomenclatoris zoologici index universalis - a correction. J SOC BIBLIOGR NATUR HIST 5(4):286.

RAPHAEL, SANDRA. 1970. The publication dates of the Transactions of the Linnean Society of London, Series I, 1791-1875. BIOL J LINN SOC 2(1):61-76.

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HERPETOLOGISTS RECORD

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HEMIPENIS MORPHOLOGY OF CORALLUS. -- In reading Garth Underwood's "A Contribution to the Classification of Snakes" (1967, PUBL BRIT MUS NAT HIST (653)), I was surprised to encounter the following statements: "Boulenger points out that snakes with hind-limb vestiges do not have spiny hemipenes (this is not quite true of Corallus caninus)" (p. 27), and, "The hemipenis /of Corallus caninus/ is bilobed and the sulcus forked, there are a few spines at the base" (p. 79).

Boids otherwise are not known to have spinose hemipenes, and the specimens of C. caninus at hand (Figure) showed none. I

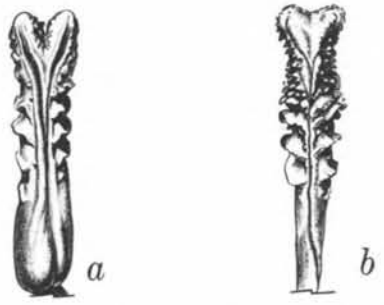


FIGURE. Everted hemipenes of two species of the boid genus Corallus: A. Corallus caninus, B. Corallus enydris. Note the absence of spines, and the presence of flounces and papillae.

wrote Dr. Underwood about this and he kindly reexamined the specimen on which his statements were based. He wrote (in litt., 2aug69), "Under low power there are what look and feel like spines in about the right place. However, under high power their shapes are irregular and I can only conclude that they are some kind of calcareous concretion associated with the manner of preservation or storage, the specimen is old."

Thus, Corallus caninus, like other members of its genus and other genera of the family Boidae, has a spineless hemipenis. The only ornamentation is made up of transverse flounces and irregular papillae. -- H. G. Dowling, AMER MUS NAT HIST, New York, N. Y. 10024. [Received 23 June 1970.] Keywords: SERPENTES: BOIDAE; REPRODUCTIVE ANATOMY; PHYLOGENY.

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UNREVIEWED-UNEDITED COMMUNICATIONS
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RELATIONSHIPS OF THE ASIAN SUNBEAM SNAKE, XENOPELTIS UNICOLOR

Herndon G. Dowling & Frances W. Gibson

The recent discovery that Xenopeltis unicolor has a typically boid chromosome complement (Cole & Dowling, 1970) adds another dimension to an analysis of its relationships. The same specimen that provided the karyotype (AMNH 104370) also offered the first opportunity of obtaining an everted hemipenis preparation. The features of the hemipenis, too, give added information on Xenopeltis relationships; these are presented here.

BACKGROUND

Xenopeltis unicolor Reinwardt (1827: 564) was early recognized as a misfit in ordinary snake classification. Bonaparte (1845) placed it in a monotypic taxon of family rank, and this separation has been recognized by almost all subsequent workers (Cope, 1864: 230; Boulenger, 1893: 167; Underwood, 1967: 65; Oldham et al, 1970: 88). Only Romer, Hoge, and Bellairs have made different taxonomic allocations.

Romer (1956: 570) placed Xenopeltis as a monotypic subfamily in his expanded Family Aniliidae (which also included the Uropeltidae). Bellairs (1970: 525) followed this allocation. Hoge (1964), on the other hand, pointed out the presence of a coronoid bone on the lower jaw of Xenopeltis -- a bone that all previous workers had claimed was absent -- and on this basis placed it in a monotypic Subfamily Xenopeltinae of the Family Boidae. This paper appears to be unknown to subsequent authors.

One other important reference to the relationships of Xenopeltis is that of Haas (1955), though he took no formal action on its classification.

FAMILIAL ALLOCATION

Xenopeltis possesses a number of primitive features. The presence of teeth on the premaxillary (found otherwise only in Anilius and some pythons) and the large left lung (about half the size of the right) have been known for many years. The presence of the coronoid bone, first pointed out by Hoge (1964), has been confirmed by us from a skull in this Museum (AMNH 29969). The apparent division of the bone as figured by Hoge, however, is probably merely a break in the specimen; the coronoids on the Museum specimen are entire.

Due probably to its burrowing habits, Xenopeltis has a skull which is stoutly constructed and possesses short supratemporal and quadrate bones. The premaxillary is in contact with the maxillaries. However, this snake does not show the extreme reduction of ventral scutes and supratemporal bone and suturing of jawbones that are characteristic of the burrowing snakes of the Aniliidae and Uropeltidae.

Xenopeltis was separated from the boids mainly on the basis of the reported lack of a coronoid bone, the reported intercalation of the supratemporal in the braincase, and the absence of pelvic elements. Of these features, only the last proves to be correct. When the feature of a typical boid karyotype is added to the summary of its true morphology, allocation of Xenopeltis to the Boidae seems reasonable in spite of the absence of pelvic elements (pelvic elements are of irregular occurrence in other families, vide List, 1966). Further, Xenopeltis shows other resemblances to at least one member of that family (see below).

SUBFAMILIAL ALLOCATION

Haas (1955) suggested a relationship between Xenopeltis and the American "burrowing python" Loxocemus, on the basis of similarities in jaw musculature. However, probably because of the lack of zoogeographic correlation and the erroneous information in the literature on the skeletal morphology of Xenopeltis, he did not suggest any change in the then-current arrangement of these snakes in separate families. Nor have other workers followed up this lead.

It is of interest, therefore, that the hemipenis morphology of Xenopeltis also suggests close relationship with Loxocemus. The hemipenis of Xenopeltis is flounced and bilobed, with a bifurcate sulcus, as is that of most boids. However, it also has unornamented apical disks (Fig. 1a). The

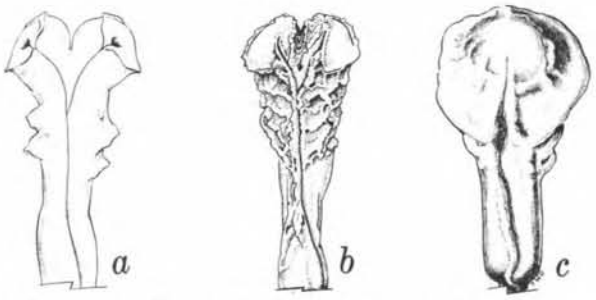


FIGURE 1. Everted hemipenes of some "burrowing pythons": a. Xenopeltis unicolor, b. Loxocemus bicolor, c. Calabaria reinhardtii. The hemipenis of Calabaria, a snake that is tentatively associated with the other two, is unique, but resembles a much-expanded disk.

only other snake known to have a hemipenis with these characteristics is Loxocemus (Fig. 1b). Though not identical, the hemipenes of these two genera are similar in all respects.

Most Old World pythons, which might have been expected to show resemblance to Xenopeltis on zoogeographic grounds, have hemipenes with a papilla at the apex of each lobe (Fig. 2). This feature has proven to be characteristic of all of the species of Python as yet examined (P. molurus, P.

regius, P. reticulatus), as well as of the allied genera Liasis and Aspidites.

We do not wish to overstate the usefulness of the hemipenis in the establishment of intergeneric relationships. However, in the absence of any clear indication of relationship in other directions, we believe that the disked hemipenes of Xenopeltis and Loxocemus support Haas's suggestion of close relationship between these genera, and their separation from those genera more closely

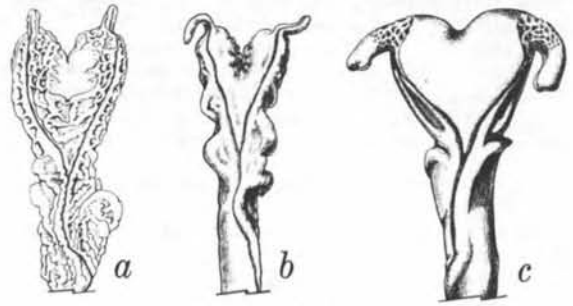


FIGURE 2. Everted hemipenes of Python and some related genera: a. Aspidites melanocephalus, b. Liasis amethistinus, c. Python molurus. The apical awns are also found in Bothrochilus and other species of Python.

related to Python. We recommend, therefore, that Loxocemus and Xenopeltis be placed in a separate subfamily of the Boidae.

Another "burrowing python" of unknown relationships is Calabaria of West Africa. It proves to have a unique hemipenis, with a single sulcus (the only one known in the Boidae) and a strange, mushroom-shaped apex (Fig. 1c). No similar organ is known in the Serpentes. The hemipenis is not particularly Xenopeltis-like, but is even less Python-like. Such an organ could have evolved from a disked hemipenis, however. Rather than leaving Calabaria in some kind of limbo, we tentatively associate it with Xenopeltis and Loxocemus, in spite of reported differences in dentition and skeletal morphology, and in spite of its further fragmentation of the range of the Xenopeltinae.

SUMMARY

The taxonomic arrangement suggested here is as follows:

Suborder SERPENTES

Superfamily BOOIDEA

Family BOIDAE

Subfamily Xenopeltinae

The included genera are Xenopeltis Reinwardt (1827: 564), Loxocemus Cope (1861: 76), and ?Calabaria Gray (1858: 154).

ACKNOWLEDGMENTS. We wish to thank Charles W. Myers and Itzchak Gilboa, of this Department, for their criticism of the manuscript.

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A LIST OF HERPETOLOGICAL TYPE LISTS

H. G. Dowling, I. Gilboa, & R. G. Zweifel

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"Committee Number 2" of the International Council of Museums began to prepare a universal catalogue of type specimens in zoology and paleontology in 1958. It was soon apparent that this was an impossible task and in 1965 the Committee's program was modified to provide a list of the catalogues of types that had already been published by various museums. This list was published in 1968? [we do not have a full citation] and contained 18 titles under "Amphibia, Reptilia," plus some additional titles under "Zoology (General)."

This Department has maintained a card file on papers which relate to herpetological type specimens for some years. We have updated this list and publish here 53 titles pertinent to this subject. We would appreciate readers bringing any additional papers to our attention.

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MEETINGS AND SOCIETIES

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CALENDAR 1970

26-31 December....AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Annual Meeting, Chicago.

26-30 December....VERTEBRATE MORPHOLOGY DIVISION, AMERICAN SOCIETY OF ZOOLOGISTS, Annual Meeting (with AAAS).

28-30 December....HERPETOLOGISTS LEAGUE, Annual Meeting (with AAAS).

CALENDAR 1971

15-19 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Los Angeles.

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The WILDLIFE PRESERVATION SOCIETY (Stevenage, England) announced that it had saved the lives of more than 1,000 toads in one week by redirecting traffic on a main road where the toads were crossing from one spawning pond to another (N. Y. Times, 5may70). [Incidentally, the IDAHO FISH AND GAME DEPARTMENT classifies bullfrogs as "fish."]

The AUSTRALIAN SOCIETY OF HERPETOLOGISTS' NEWSLETTER (11) carries numerous items of interest, including news of the research efforts of various members. The Society objected to our listing of such titles previously, so we refer you to their publication.

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INDIVIDUALS AND INSTITUTIONS

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J. A. HOLMAN (Michigan State U.) is studying (among other things) an Upper Miocene herpetofauna from the Wood Mountain Formation of Saskatchewan.

THE THIRD DRESDEN TERRARIUM SHOW (July & August) had a number of herpetological exhibits, including some 25 species of venomous snakes (AQUAR TERRAR 17(4): 124).

SCOTTISH SEA MONSTERS are in the news again this tourist season, with an ecologist suggesting that the Loch Ness Monster may have been killed by pollution (an idea shrilly objected to by locals). Fortunately, however, a competing monster named Morag has been reported from nearby Loch Morar.

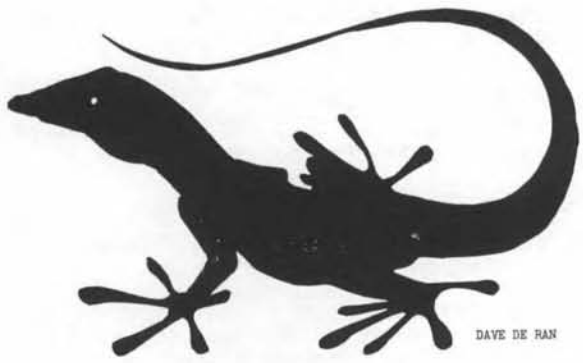
The BUREAU OF SPORT FISHERIES AND WILDLIFE reported that among the 78,045,922 live animals imported into the United States last year (almost 74 million fishes) were 339,489 amphibians and 1,393,970 reptiles. The ENDANGERED SPECIES CONSERVATION ACT, which (among other things) makes the importation of animals protected in their country of origin illegal, goes into effect on 3 August 1970.

RUTGERS UNIVERSITY: JAMES D. ANDERSON is teaching ecology, after a year's sabbatical working on various Ambystoma projects. SAMUEL B. McDOWELL is visiting the British Museum to look at sea snakes.

UNIVERSITY OF RHODE ISLAND: VICTOR H. HUTCHISON will move to the University of Oklahoma as Chairman of the Zoology Department. C. ROBERT SHOOP will take over Hutchison's post as Director of URI's INSTITUTE OF ENVIRONMENTAL BIOLOGY. ROBERT W. GUIMOND (Ph.D., 1970) will stay at URI for a year as instructor in zoology. JAMES D. LAZELL received his Ph.D. in June (anoline lizards of the Lesser Antilles). TERRY E. GRAHAM has taken a position in the Biology Department of Worcester State College, Worcester, Mass.

AMERICAN MUSEUM OF NATURAL HISTORY: C. J. COLE is in Mexico for about three months, collecting lizard chromosomes. JANIS A. ROZE goes on the full-time staff of the City College of New York. C. M. BOGERT (Curator Emeritus) reports that he has obtained two more specimens of his new boa, Exiliboa placata, in Oaxaca.

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members desiderata

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SYLVESTER DIETRICH (Hidden Ridge Lab., Route 2, Box 142, New Haven, Mo. 63068) has back issues of Herpetologica, Copeia, PHS Bulletin, and Rephibia for sale.

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ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be typewritten on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $16.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4 3/8 inches (one column) or 9 1/4 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 12 5/8 inches). Line cuts are reduced 25 per cent in processing.

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook of Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.

UNREVIEWED-UNEDITED COMMUNICATIONS

"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

This section is supported entirely by its authors and their sponsors. Page charges pay the costs of publication, distribution, and 100 author's reprints. Illustrations may be included but must be reduced to proper dimensions (see Advice to Authors).

Page charges are: $20 for a single page (148 lines of about 40 characters and spaces); $40 for the two-page maximum (300 lines). Include an allowance for the title and author's name and five lines for the address and received date. [Send a check for the proper amount with the manuscript, or if you prefer, we will bill you that amount for reprints.]

BIOLOGY OF REPTILIA

General Editor: CARL GANS,
State University of New York, Buffalo, New York

This multi-volume treatise presents a comprehensive view of the class *Reptilia*. The work is divided into the sub-areas of morphology, embryology and physiology, and behavior and ecology. Volume 1 introduces the general area of morphology, beginning with a statement of the pre-history of the major groups of recent reptiles and going on to deal with bone as a tissue, and with such osseous elements as epiphyses and sesamoids, the turtle shell, the vertebral column and ribs, and the reptilian dentition.

VOLUME 1: MORPHOLOGY A—co-edited by A. d'A. BELLAIRS, St. Mary's Hospital Medical School, London, England, and THOMAS PARSONS, University of Toronto, Ontario, Canada

Contents: ROBERT L. CARROLL: **Origin of Reptiles:** Introduction. The Ancestry of Living Reptiles. Lower Permian and Carboniferous Reptiles. Paleozoic Amphibians and the Origin of Reptiles. The Environment of Early Reptiles. Definition of a Reptile. Summary. References. DONALD H. ENLOW: **The Bones of Reptiles:** Introduction. Early History. Types of Reptilian Bone Tissue. Patterns of Bone Structure in Modern Reptiles. Significance of Cortical Stratification. Evolution of Reptilian Bone. Bibliography and References. R. WHEELER HAINES: **Epiphyses and Sesamoids:** Introduction. Epiphyses and Related Structures. Sesamoids. References. A. G. EDMUND: **Dentition:** Introduction. Dental Morphology. Dental Development. The Egg Tooth and Egg Caruncle. Description of Fossil and Recent Dentition. References. ROBERT HOFFSTETTER and JEAN-PIERRE GASC: **Vertebrae and Ribs of Modern Reptiles:** Introduction. General Morphological Features of Reptilian Vertebrae and Ribs. Structural Patterns in the Living Order of Reptiles. Conclusions. References. RAINER ZANGERL: **The Turtle Shell:** Introduction. Anatomy of the Turtle Shell. Comparative Morphology of the Turtle Shell. Phylogenetic History of the Turtle Shell. Summary. References. Author Index-Subject Index.

1969, 373 pp., $13.00

VOLUME 2: MORPHOLOGY B—edited by CARL GANS.
Co-edited by THOMAS S. PARSONS

CONTENTS: GARTH UNDERWOOD: **The Eye**: Introduction. Embryology. Lacertilia and Amphisbaenia. Snakes. Rhynchocephalia. Testudines. Crocodilia. Scleral Ossicles of Extinct Forms. General Discussion. Systematic Discussions. Acknowledgements. References. THOMAS S. PARSONS: **The Nose and Jocobson's Organ:** Introduction. Major Regions and Structures of the Reptilian Nose. Adult Anatomy of the Nasal Organs. Histology of the Nasal Organs. Embryology of the Nasal Organs. Nasal Glands. Discussion. Acknowledgements. References. IRWIN L. BAIRD: **The Anatomy of the Reptilian Ear:** Introduction. General Aural Anatomy of a "Typical" Lizard. The External and Middle Ear in Various Reptilian Groups. The Internal Ear of Various Reptilian Groups. Summary. Acknowledgements. Lists of Materials. References. ROBERT BARRETT with appendices by P. F. A. MADERSON and RICHARD M. MESZLER: **The Pit Organs of Snakes:** Introduction. Diffused Temperature Receptors. Radiant Heat Receptors. Unanswered Questions Requiring Further Research. References. Appendix 1: P. F. A. MADERSON: Appendix. Acknowledgements. References. Appendix 2: RICHARD M. MESZLER: Structure. Correlation of Structure and Function. References. CARL GANS and THOMAS S. PARSONS: **Taxonomic Literature on Reptiles:** Introduction. Assistance of Specialists. The Nature of the Taxonomic Literature. Literature Reviews and Special Journals. Listing by Groups. Regional Listings. Acknowledgements. References. Author Index-Subject Index.

1970, 374 pp., $16.50

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CONTENTS: HERBERT C. DESSAUER: **Blood Chemistry of Reptiles:** Physiological and Evolutionary Aspects: Introduction. Blood Letting and Handling. Composition of Blood Plasma. Composition of the Red Blood Cells. Blood Composition and Reptilian Systematics. Summary. Acknowledgements. References. MARIE-CHARLOTTE SAINT GIRONS: **Morphology of the Circulating Blood Cells:** Introduction. Erythrocytes. Eosinophilic Granulocytes. Basophilic Granulocytes. Azurophilic Granulocytes. Neutrophilic Granulocytes. Lymphocytes. Plasma Cells. Monocytes. Thrombocytes. Parasites in the Blood of Reptiles. Summary. References. R. DUGUY: **Numbers of Blood Cells and Their Variation:** Introduction. Techniques. Erythrocytes. Leucocytes. References. DALE E. BOCKMAN: **The Thymus:** Introduction. General Morphology. Embryonic Development. Histology. Fine Structure. Thymic Involution. Conclusion. Acknowledgements. References. HUBERT SAINT GIRONS: **The Pituitary Gland:** Introduction. The Hypothalamic-Neurohypophyseal Complex. The Adenhypophysis. Embryonic Development in Vascularization. Comparative Morphology of the Reptilian Hypophysis. Conclusions. References. W. GARDNER LYNN: **The Thyroid:** Introduction. Gross Morphology. Histology and Cytology. Embryology. Thyroid-Pituitary Relations. Biosynthesis of Thyroid Hormones. Seasonal Changes in the Thyroid. The Thyroid and Metabolism. The Thyroid and Ecdysis. The Thyroid and Growth and Differentiation. The Thyroid and Other Endocrine Organs. Miscellaneous Effects of Thyroid Hormone. Conclusion. References. NANCY B. CLARK: **The Parathyroid:** Introduction. Testudines. Crocodilia. Lepidosauria. References. MARFRED GABE: **The Adrenal:** Introduction. Embryonic Development. Macroscopic Anatomy. Microscopic Anatomy. Cytological and Histochemical Characteristics of Internal Cells. Cytological and Histochemical Characters of the Adrenal Cells. Histophysiology. Conclusion. References. MALCOLM R. MILLER and MICHAEL D. LAGIOS: **The Pancreas:** Introduction. Embryology. Topography and Structure. Histology. Conclusion. Acknowledgements. References. Author Index-Subject Index.

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JUNE 1970

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VOLUME 2, NUMBER 2. JUNE 1970

•CONTENTS

ARTICLES

4 SSAR MEETING IN KANSAS CITY, by James L. Vial.
A major symposium on anuran evolution is planned for the Thirteenth Annual Meeting, 27-30 August.

UNREVIEWED-UNEDITED COMMUNICATIONS

35 THE KARYOTYPE OF XENOPELTIS UNICOLOR, by C. J. Cole & H. G. Dowling.
The chromosomes of this taxonomically-isolated snake suggest boid relationships.

37 THE RELATIONSHIPS OF HYDRODYNASTES BICINCTUS and CYCLAGRAS GIGAS, by H. G. Dowling & F. W. Gibson. Similar morphological characters suggest a congeneric arrangement of these two Neotropical snakes.

DEPARTMENTS

2 EDITORIAL

3 CONSERVATION NEWS
Recent report on Galapagos tortoises.

NEWS & ANNOUNCEMENTS
7 Meetings and Societies.
Individuals and Institutions.
8 Fifty Years Ago.

BOOK REVIEWS
6 Cooper on the Maryland survey.
39 Brame on European salamanders.

HERPETOLOGISTS RECORD
40 J. A. Roze corrects errors in Scaphiodontophis paper.

MEMBERS DESIDERATA
40 Yuhas asks for western Ambystoma.
Cole wants certain Tantilla.

41 ADVICE TO AUTHORS
And an explanation of "Unreviewed-Unedited."

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BIBLIOGRAPHIC NOTE
****
Numbers 1 through 9 of HERPETOLOGICAL REVIEW appeared irregularly from 1967 through 1969.

A volume number, "Volume 2," was printed on the first issue to appear in 1970, as an indication of the REVIEW'S current status as a quarterly. Thus, numbers 1 through 9 (1967-1969) are included in Volume 1.
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EDITORIAL

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Delays in the makeup, printing, and mailing of HERPETOLOGICAL REVIEW 2(1) have prevented my knowing the reaction to its various innovations before this second number goes to press. Even so, a note has appeared in HERPETOLOGICA 26(1): 155, announcing the HR "Letters" section and the proposed "Unreviewed-Unedited" section. We hope that editors of other journals will accept the ideas as well.

As a start two papers are here published in this latter section. [It is my fervent hope that future issues of HR will not be so dowling-oriented.] Meanwhile, the REVIEW badly needs major articles, photographs of interesting animals, herpetologists, habitats, and happenings, book reviews, and about anything else you can think of. CONTRIBUTORS PLEASE COME FORWARD!! We will do anything but pay you.

****

Two other new departments are under consideration for future issues. One is an "Amphibian and Reptile Chromosomes" section, where concise information on the number and kind of chromosomes of various species could be recorded in tabular form [detailed descriptions can be given in the "Unedited" section, or elsewhere]. The other is a "Herpetologist's Record" section, where new geographic records, longevity records, emendations of previous records, and corrections of these and other kinds of information could be presented in concise form. Many records of this kind are not worth expanding into journal articles -- and the number of journals that will take such notes is rapidly shrinking. Yet, the information may be of great value to some, and should be made available promptly.

Both of these suggestions have grown out of conversations with Itzchak Gilboa and other associates. We believe that the provision of these additional places to record information (as distinguished from the published results of scientific studies) will fill important gaps in the present system of the retrieval and dissemination of herpetological information. -- HGD.



RECENT REPORT ON GALAPAGOS TORTOISES: SOME SURVIVE

Peter Pritchard ("Turtles of the World"; U Florida) spent some weeks in the Galapagos Islands recently, and perhaps we will have a detailed report from him some time. Meanwhile, we have some good news -- and we have some bad news.

A few weeks ago Roger Peterson called to say that he and Miguel Castro were in town, and would like to see me. It turned out that Roger was en route to Antarctica, and Miguel was on his way to Aldabra and the Seychelles.

Miguel Castro, for you who do not know, has spent some five years of his life working directly on the discovery, censusing, and preservation of the remaining colonies of giant tortoises in the Galapagos. Without doubt, he knows more of their status and prospects than any other man.

****

ROUGH CENSUS OF GALAPAGOS TORTOISES

Geochelone elephantopus

****

ISLAND	NUMBER	BREEDING
Duncan	105	No*
Hood	5**	No
Isabela	Several colonies	Yes
James	120+	No***
Pinta	Extinct (ca. 1965)	--
San Cristobal	64	No***
Santa Cruz	****	Yes

Goats were introduced on Pinta in about 1953. * Young eaten by introduced rats. ** Three of these now at Darwin Research Station. *** Young eaten by pigs, dogs. **** Large number of marked individuals (I forgot to ask current count).

****

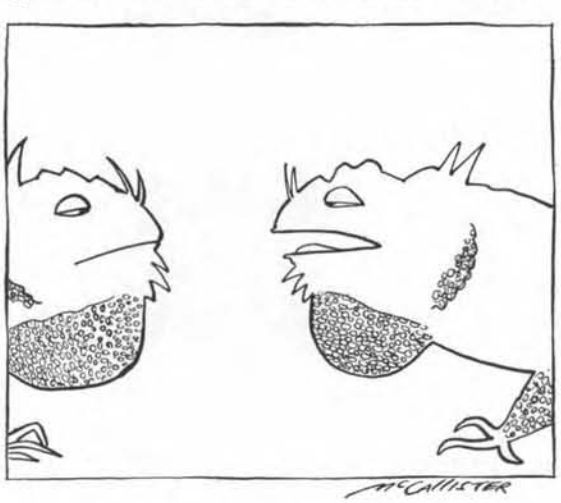
It was in 1962 that four of us (Robert Chase of Lafayette College, Rene Honegger of the Zurich Zoo, David Boyer of National Geographic, and I) first met this amazing home-grown naturalist. Others in the Galapagos might be more cosmopolitan, have better boats, or tell funnier stories, but it was Miguel who impressed us with his detailed knowledge of the migrations of birds and tortoises, the breeding habits of Marine and Land iguanas, and the status and distributions of the remaining colonies of the many rare and vanishing animals of that archipelago.

Thus, he was our choice as the first Conservation Officer of the Galapagos: a position subsidized for an original three years (and then extended) by the New York Zoological Society, and administered by the Charles Darwin Foundation for the Galapagos Isles. He worked in this position for almost five years.

During this time, he discovered and marked hundreds of tortoises on the various islands, reduced the goat herds that were threatening the extinction of endemic flora and fauna on some of the smaller islands, and hatched more than 100 tortoise eggs which he collected on Duncan Island -- representatives of a race that has not bred successfully in the wild (because of introduced Norway rats) in this century.

The program of tortoise conservation is badly threatened by Miguel's absence from the islands. No one else can offer the knowledge and leadership that he provided. I would guess, from my brief recent conversations with him, that his leaving was triggered by a number of things, including the resentment by several of his neighbors of his firm stand on the protection of the tortoises (killed, especially for their reservoir of fat, by fisherman) and the inviolability of the tortoise conservation areas which were set aside by the government of Ecuador. He also had some personal problems (his wife was killed under unexplained circumstances, during one of his absences). Perhaps not the least of his reasons, however, was frustration over the conservation policies (or lack of them) of the Foundation and the feeling that he was not backed strongly enough to carry out his job properly (e.g., there was often no boat available for him to use, to get from island to island).

We hope, nevertheless, that Miguel Castro will return to the islands that need him so much and thus reinvigorate the conservation program of the Darwin Foundation. -- HGD.



"As the lone surviving male and female, the perpetuation of our species depends on us. I'm willing to say the hell with it if you are."

Drawing by McCallister; Copyright 1970 The New Yorker Magazine, Inc.

SSAR MEETING IN

During August 27-30 the Society will be holding its thirteenth annual meeting at the University of Missouri-Kansas City in the "Heart of America".

Located on the southern edge of metropolitan Kansas City, Missouri, UMKC is an urban institution serving a community of nearly one million residents. Of the 9,800 students enrolled about 35 per cent are pursuing graduate or professional studies.

The Society will have full use of the campus facilities during this "between sessions" period of the academic calendar. Coincidentally, some of Kansas City's most exciting and entertaining activities are offered during this time of year.

All formal sessions of the meetings will be held in the University Student Center, one of the newer campus facilities. Housing will be provided at the UMKC dormitory and meals (including breakfast and lunch) will be provided in the Student Center. Additional lodging and meals are available at the numerous hotels and restaurants in Kansas City, at a great range in quality, atmosphere and, of course, price.

Tentative plans include the Board of Directors meeting Thursday evening and a social gathering aboard the Missouri River stern-wheeler "Border Starr" on Friday evening. A photographic exhibit is also planned. There will be three sessions of presented papers and three symposium sessions.

We are particularly pleased to announce the symposium on Evolutionary Biology of Anurans, which will be a principal feature of this year's meeting. Outstanding authorities, including scientists from Australia, Europe and South America will be presenting major papers or participating in the discussion sessions. The emphasis of this program will be upon broad biological perspectives, thus the topics and names of participants should be of immediate interest to all herpetologists.



This north-facing aerial view shows a portion of the UMKC campus. The University Student Center is located immediately above the circle drive. To the right, adjacent to the drive, is the Chemistry-Biology building. In the lower foreground is the converted mansion which currently houses many administrative offices. The Linda Hall Library of Science and Technology is just off the photograph at the lower left.

KANSAS CITY
27–30 AUGUST

Dr. W. Frank Blair (University of Texas) will present the introductory address and preside over the program. Among the participants will be James P. Bogart (University of Texas), William E. Duellman (University of Kansas), Richard Estes (Boston University), Sheldon I. Guttman (Miami University - Ohio), Robert F. Inger (Field Museum of Natural History, Chicago), John D. Lynch (University of Nebraska), David J. Merrell (University of Minnesota), George B. Rabb (Chicago Zoological Park), Stanley N. Salthe (Brooklyn College, New York), Jay M. Savage (University of Southern California), Arne Schiotz (Danmarks Akvarium, Denmark), Priscilla Starrett (University of Southern California), Ian Straughn (University College of Townsville, Australia), Joseph A. Tihen (University of Notre Dame), Linda Trueb (University of Kansas), and Richard Wasserzug (University of California at Berkeley). We have not yet received definite commitments from the invited South American scientists.

***

Further details of the program, registration, accommodations and transportation will be included in a future announcement being mailed to all members. Any inquiries may be addressed to the chairman of the meeting: James L. Vial, Department of Biology, University of Missouri-Kansas City, Kansas City, Missouri 64110.

***

EVOLUTIONARY BIOLOGY OF ANURANS
PROGRAM

INTRODUCTION: MAJOR PROBLEMS IN ANURAN EVOLUTION.

SESSION I

1. Origins and Early Evolution of Anurans.
2. Evolutionary Trends in Anuran Osteology.
3. Transition from Archaic to Advanced Frogs.
4. Biochemical Trends in Anuran Evolution.

Panel Discussion

SESSION II

5. Evolutionary Biogeography.
6. Evolution of Mating Behavior.
7. Evolution of Reproductive Adaptations.
8. Evolutionary Patterns in Larval Morphology.
9. Ecological and Behavioral Patterns of Anuran Larvae.

Panel Discussion

SESSION III

10. Evolution of Mating Calls: Bioacoustical Considerations.
11. Evolution of Mating Calls: Ecological Considerations.
12. Evolution of Karyotypes.
13. Populational Evolution of Anurans.

Panel Discussion

SUMMATION PANEL



Registration and all formal sessions of the 13th annual SSAR meeting will convene in the Student Center.

book review

DISTRIBUTIONAL SURVEY: MARYLAND AND THE DISTRICT OF COLUMBIA. By Herbert S. Harris, Jr. Bull. Md. Herp. Soc. 5(4): 97-161, December 1969, 89 maps, $2.

Although political boundaries per se are of little or no interest to biogeographers, ecologists, and other students of distribution, the "state list" has always been a handy way for local workers to present what may well be a wealth of distributional information. Such surveys are particularly useful if they emphasize geomorphological subdivisions, faunal areas, and drainage patterns for aquatic forms, and include detailed maps.

The state of Maryland (plus the District of Columbia) occupies a position of considerable interest to herpetogeographers. Not only does one encounter portions of three major geomorphic regions within its boundaries (Appalachian, Piedmont and Coastal Plain), and elements of two major drainage systems (Ohio and Atlantic Coast), but two reptile species appear to reach the southernmost limit of their major, non-relictual range in the state and adjacent Delaware, and at least six amphibians and reptiles reach similar northernmost limits there.

In this latest distributional survey of the herpetofauna of Maryland and D. C., Herbert S. Harris, Jr., has scrupulously tried to track down every locality record which has turned up in the decade since publication of Cooper's 1960 survey, has added some records previously missed, and, more importantly, has meticulously plotted all of these on annotated distribution maps for each species. The result is the most up-to-date and detailed visual picture of the distribution of Maryland reptiles in a quarter of a century, and the only such picture ever presented for the amphibians. The survey also includes a list of amphibians and reptiles of the area being considered, a discussion of erroneous records and possible additions, county and physiographic province lists, a physiographic map of the state, and a bibliography.

Criticisms of the paper are mostly, but not completely, minor. The usual typographical errors which one finds even in more pretentious publications are present, but not overly distracting except to proponents of the picayune. Some slight inconsistency is noted in use of the map symbols indicating specimens examined, etc., and in the citing of authorities for some notable records and comments and not for others. The annotations include some interesting and disturbing facts related to distribution, such as the filling in of one of the two known Western Shore breeding ponds of Ambystoma t. tigrinum for construction of a golf course, and a plea for conservation of Cryptobranchus whose numbers are apparently dwindling in Maryland. It is a little difficult to understand, however, the inclusion of occasional comments on normal breeding habits of some species (but not all) in a distributional survey.

A few of the statements are questionable. For example, Pseudotriton m. montanus is said to be "Found commonly in association with springs". In truth this almost exclusively Coastal Plain salamander is rarely, if ever, associated with springs in Maryland, although elsewhere in its range it may be Piedmont in distribution and live in such situations. Opheodrys aestivus is said to "encroach the Piedmont via rivers," and, similarly, Lampropeltis g. getulus "encroaches the Eastern Piedmont via river systems". It is not being finicky to point out that what is apparently meant here is encroachment by range expansion into lowland river valleys, not "via rivers" or "river systems", which implies swimming or passive transport upstream! No comment is made on an isolated record for O. aestivus in the Appalachian Plateau. Lampropeltis d. triangulum "intergrades with L. d. temporalis along the Fall Line, hence this criteria (sic) is used here to separate the subspecies". No area of intergradation is shown on the map, despite the fact that these subspecies intergrade over a wide area on both sides of the Fall Line. The allegation is made that Storeria d. dekayi is "Most abundant around populated areas". A more likely statement would be that compression of suitable habitat in such areas results in greater population density, if indeed the claim can be quantitatively substantiated at all. Storeria o. occipitomaculata is a very abundant snake on the Alleghany Plateau, "where melanistic individuals are not uncommon". Although the whole comment is rather much beside the point in this context, the Alleghany Plateau specimens of this snake in Maryland are almost exclusively dark, and it is the light specimens which are seldom seen there. This may well be an ecophenotypic response and an argument against genetic melanism. The bibliography, while not exactly "complete", is still extensive and very useful. A drainage system map and a map of faunal areas would have been useful, with appropriate distributional comments.

Despite these criticisms, this publication is a very good summary of our current knowledge of the distribution of amphibians and reptiles in an important sector of the Atlantic Coast. Herb Harris and the Maryland Herpetological Society are to be commended for their efforts.

JOHN E. COOPER

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UNIVERSITY OF KENTUCKY
Lexington, Kentucky 40506

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MEETINGS AND SOCIETIES

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CALENDAR 1970

23-29 August....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Bloomington, Indiana.

27-30+August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Kansas City, Missouri.

26-31+December....AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Annual Meeting, Chicago.

26-30+December....VERTEBRATE MORPHOLOGY DIVISION, AMERICAN SOCIETY OF ZOOLOGISTS, Annual Meeting (with AAAS).

28-30+December....HERPETOLOGISTS LEAGUE, Anual Meeting (with AAAS).

CALENDAR 1971

15-19 June....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, Los Angeles.

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LATE NEWS

The 50th Annual Meeting of the AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, held in New Orleans, 26-30 March, was probably the best-attended in the Society's history. More than 400 persons registered. Of the 164 papers listed on the program, 91 were herpetological. [Compare "Fifty Years Ago"].



"Two falls out of three, O.K.?"

Drawing by W. Miller; Copyright 1970
The New Yorker Magazine, Inc.

The ASSOCIATION OF SOUTHEASTERN BIOLOGISTS held its 31st Annual Meeting at Florida Southern College, Lakeland, on 1-4 April. Nine herpetological papers were presented in a special "Ichthyology and Herpetology" section; another five were given in the section on "Animal Physiology".

The SOUTHWESTERN ASSOCIATION OF NATURALISTS held its 17th Annual Meeting at College Station, Texas, on 23-26 April. Three of the eight herpetological papers dealt with parthenogenic species of Whiptail lizards, Cnemidophorus.

****

INDIVIDUALS AND INSTITUTIONS

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A Reuters dispatch of 5 March reveals that "Australian Customs men have smashed an international snake-smuggling ring". The arrest of ten men in Sydney, Bundaberg, and Townsville is believed to have stopped the illegal importation of venomous snakes from the United States, Canada, India, and the Pacific Islands. Some snakes had been sent by mail.

JAMES A. OLIVER (previous Director of the Bronx Zoo, recent Director of the American Museum of Natural History) has rejoined the New York Zoological Society (after a ten-year lapse) as Director of the New York Aquarium.... LINDA TREUB (frog anatomy, U Kansas) has announced the birth of a daughter, Dana Kirsten Duellman, on 11 March.... JAREN HORSLEY (formerly of the Oklahoma City Zoo) joined the National Zoological Park as Curator of Reptiles in 1969.... KEVIN BOWLER (also formerly of the Oklahoma City Zoo) has recently become Assistant to the Director of the Philadelphia Zoo (ROGER CONANT).

ROBERT MERTENS (herpetologist & Director Emeritus of the Senckenberg Museum) celebrated his 76th birthday on 12 January.... FRED R. CAGLE (1915-1968) was the first recipient (posthumous) of the Meritorious Award for Excellence in Scientific Communication, presented by the Council of Biology Editors, 19 May 1969.

MAX A. NICKERSON (Arkansas State U) and others are studying Cryptobranchus alleganiensis bishopi.... EDWARD WORTHAM (ASU) is studying the serum proteins of that salamander, and CHARLES E. MAYS (DePauw U) is aiding in a tagging study of it.... JIM GRISSOM (ASU) is studying serum proteins of some plethodontid salamanders.... JAMES A. HUTCHISON (ASU) and Dr. Nickerson are studying the distribution of Basidiobolus ranarum, a common saprobe in salamanders, frogs, and lizards, that is suspected as an etiologic agent of Phycomycosis in humans.

EUGENE S. GAFFNEY (turtle taxonomy) will

become Assistant Curator in the Department of Vertebrate Paleontology, American Museum of Natural History, on 1 July.... STEVEN C. ANDERSON (lizard taxonomy; Calif. Acad. Sci.) will move to University of the Pacific, Stockton, Calif., as of 1 August.

RECENT AND ANTICIPATED DEGREES

LUCINDA CONRADS (MS: SW Texas State U), "Demography and ecology of the Fern Bank salamander, Eurycea pterophilia."... DIANA DOWDEN (MS; SW Texas State U), "Population dynamics of the San Marcos salamander, Eurycea nana."... ROBERT W. GUIMOND (PhD; U Rhode Island), "Gas exchange in Amphiuma, Cryptobranchus, Necturus, and Siren."... THOMAS A. JENSSEN (PhD'69; U Okla), "Ethoecology and display analysis of Anolis nebulosus." [He now has a postdoctoral fellowship to study Jamaican anoles with E. E. WILLIAMS.]... RICHARD J. KOSH (PhD; U Rhode Island), "The role of the parietal eye in temperature selection and tolerance of Anolis carolinensis."... RICK McDANIEL (MS; Texas A & I U), "A morphological investigation of Siren from southern Texas."... CHARLES W. MYERS (PhD; U Kansas), "The systematics of Rhadinaea (Colubridae), a genus of New World Snakes." [Now Assistant Curator of Herpetology, American Museum of Natural History.]... WILLIAM B. PRESTON (PhD'69; U Okla), "The comparative ecology of two water snakes, Natrix rhombifera and Natrix erythrogaster, in Oklahoma." [Now Curator of Vertebrates, Manitoba Museum of Man and Nature, Winnepeg.]

****

DUES AND SUBSCRIPTIONS: A RECORD (SOUTHWESTERN ASSOCIATION OF NATURALISTS)*

YEAR	MEMBERSHIP DUES	SUBSCRIPTIONS TO SW NATUR MEMBERS	INSTITUTIONS
1953	$1	-	-
1955	2	-	-
1956	"	$2	$4
1958	"	3	5
1968	"	"	7
1970	3	"	10

* Data mainly from SWANEWS 1970(2).

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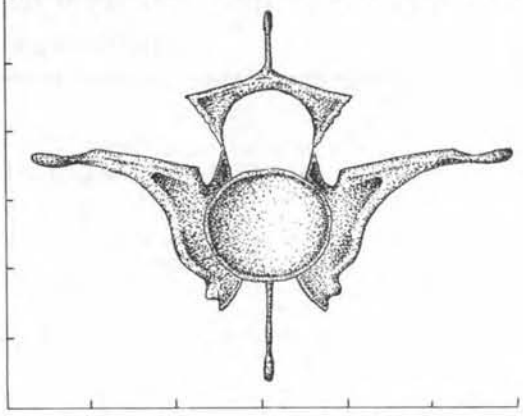
50 YEARS AGO

****

The Fifth Annual Meeting of the AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS was held in Room 43, U. S. National Museum, Washington, D. C., on Friday, May 14, 1920.

Ten members were present at the business meeting. Eleven papers were read, six of them herpetological. Perhaps the two of greatest significance were: "The genetic relations of the Salientia," by G. K. Noble, and "The correlation of lunglessness in salamanders with a mountain-brook habitat," by Inez W. Wilder and E. R. Dunn.

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THE LIFE OF REPTILES [Two volumes]. By Angus Bellairs. 1970. Universe Books, New York. xi + 590 p., 149 fig., 78 pl. $25 per set.

A FIELD GUIDE TO THE SNAKES OF SOUTH VIETNAM. By Simon M. Campden-Main. 1970. Publ. Division of Reptiles and Amphibians, U. S. National Museum, Washington, D. C. v + 114 p., ill.

CHECKLIST AND KEY TO THE HERPETOFAUNA OF LOUISIANA. By Edmund D. Keiser, Jr. & Larry David Wilson. 1969. Lafayette Natural History Museum, Technical Bulletin 1, Lafayette, Louisiana. 50 p., 7 fig. $1.50.

PHYSIOLOGY OF THE AMPHIBIA. By John A. Moore [Editor]. 1970 [Reprint of 1964 edition]. Academic Press, New York & London. xii + 654 p., ill. $19.50.

CATALOGUE OF THE NEOTROPICAL SQUAMATA. Part I. Snakes. By James A. Peters and Braulio Orejas-Miranda. Part II. Lizards and Amphisbaenians. By James A. Peters and Roberto Donoso-Barros. 1970. U. S. National Museum Bulletin 297. U. S. Government Printing Office, Washington, D. C. vii + 347, & vii + 293 p., ill. $6.75 per set.

CURRENT HERPETOLOGICAL TITLES, X: 1969 - 1970

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New York, N. Y. 10024

In the last two and a half years we brought to your attention some 10,000 current titles in the pages of this journal.

The titles of papers appearing in our lists were obtained by regular scanning of about 2500 journals directly and over 1000 indirectly, through secondary sources such as Chemical Abstracts-Biochemical sections, Current Contents, publishers' catalogs, and several others. Theses in English also appear, coming from such sources as Dissertation Abstracts and various academic publications. Abstracts of papers presented at various meetings and symposia are included. This list contains the abstracts of papers presented at the ASIH, SSAR and the 2nd Int. Symp. Anim. Plant Toxins among others. We note the absence of abstracts from the Herpetological League meeting. The coverage of books and theses in languages other than English is improving because a larger number of our colleagues bring those titles to our attention. Some copies have been mailed directly to us for inclusion in our lists. However, we would still appreciate being made aware of new books, reports, and non-English theses especially.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of some interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any paper that is concerned with a member of a Recent order of amphibians or reptiles.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive and considerably more current.

This tenth list contains titles of books and articles that have come to our attention during the period 6 January 1970 through 28 April 1970. The list is divided into two separate, alphabetically arranged sections: one for titles published in 1969, and one for titles published in 1970.

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and T. Shaman. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need, however, and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 20 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

HERPETOLOGICAL
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OFFERS:

"CURRENT TITLES" for 1970 on Library Cards, about one-third of them with abstracts. Also available for 1968 & 1969 (Library of Congress stock, hole-punched, alphabetical).

BIBLIOGRAPHIES of individual authors.

SPECIAL BIBLIOGRAPHIES on amphibians and reptiles, restricted by subject and/or taxon and/or geography.

COPIES of original descriptions or other important literature.

DRAWINGS of important taxonomic features (see above).

CONSULTATION on projects involving amphibians and reptiles, their literature, morphology, economics....

FOR INFORMATION ON AVAILABILITY AND COST, WRITE:
H. G. Dowling, HISS Director
American Museum of Natural History
New York, N. Y. 10024

(PAID ADVERTISEMENT)

ABALOS,J.W. and R.NADER
1969. Los habitos ofiofagos de Pseudoboa cloelia y P. maculata.
REV FAC CIENC EXACTAS FIS NATUR UNIV NAC CORDOBA 29(3-4):5-12, 6 fig. (Span, Engl summ)

ABRAMOVA,R.A. and E.A.MANUKIAN
1969. The effect of some reagents on the functional activity of the frog's retina. (First report).
BIOL ZH ARM 22(8):71-76, 3 fig. (Russ, abstr. Arm)

ACHER,R., J.CHAUVET and M.T.CHAUVET
1969. The neurohypophyseal hormones of reptiles: comparison of the viper, cobra, and elaphe active principles.
GEN COMP ENDOCRINOL 13(3):357-360.

ACHOLONU,ALEXANDER D.
1969. Some monogenetic trematodes from Louisiana turtles.
PROC LA ACAD SCI 32:20-25, 6 fig.

ADLER,KRAIG
1969. How do trained frogs find a goal box?
J HERPETOLOGY 3(3-4):198. (abstr)

ADLER,KRAIG KERR
1969. Environmental control of locomotor activity in a salamander (Plethodon glutinosus). (Avail. Univ. Microfilms, Ann Arbor, Mich. Order No. 69,12022).
DISS ABSTR B 30(2):882B.

AGARWAL,GYAN, GERALD GOTTLIEB and LAWRENCE STARK
1969. Models of muscle proprioceptive receptors, p. 569-594, 16 fig., 3 tab., In, Fourth annual Nasa-University conference on manual control. Nasa Technology Utilization Publ (NASA SP-192).

ALBERTI,K.G.M.M. and G.W.G.SHARP
1969. Four classes of steroid identified by their interaction with mineralocorticoid receptors in the toad bladder.
BIOCHEM J 115(5):45P.

ALCALA,A.C.
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SILLIMAN J 16(3):257-262, 2 fig.

ALEXA,ELIZA
1969. Ventricular mechanics in turtle heart studied by photomechanographic methods.
REV ROUM BIOL SER ZOOL 14(4):285. (abstr)

ALEXANDER,NANCY J. and WOLF H.FAHRENBACH
1969. The dermal chromatophores of Anolis carolinensis (Reptilia, Iguanidae).
AMER J ANAT 126(1):41-56, 5 pl.

ALLEN,ANDREW
1969. The edible frog.
AQUARIST AND PONDKEEPER 34(7):204-205, photo.

AMBROSIUS,H. and G.HOHEISEL
1969. Electron-microscopic study of antibody-producing (plaque-forming) spleen cells of the tortoise Agrionemys horsfieldi Gray.
EXPERIENTIA (BASEL) 25(11):1177-1178, 2 fig.

ANDERSON,MARIE E. and IAN P.CALLARD
1969. Pituitary cytology in the lizard, Sceloporus cyanogenys.
VA J SCI 20(3):109. (abstr)

ANGLE,JOHN P.
1969. The reproductive cycle of the Northern ravine salamander, Plethodon richmondi richmondi, in the valley and ridge province of Pennsylvania and Maryland.
J WASH ACAD SCI 59(7-9):192-202, 7 fig., 2 tab.

ANON
1969. Alabaster.
KANSAS SCH NATUR 16(2):14-15, photo.

ANON
1969. Arrete No. 69, 239 ID/2B AG reglementant la capture des tortues de mer, la recolte de leurs oeufs et l'utilisation de ces produits dans le departement de le Guyane (dated 26/2/69).
IUCN PUBL (N.S.) suppl 20:96-97.

ANON
1969. Crocodiles in Blue Nile gorge.
ORYX 10(3):144.

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1969. Crocodiles decrease in Natal.
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1969. Crocodile research in Papua.
ORYX 10(3):148.

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1969. Discovery.
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TURTOX NEWS 47(9):300.

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NATURE (LONDON) 224(5224):1057-1058, illus.

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1969. Hands off the Galapagos tortoises.
ORYX 10(3):150.

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1969. Herpetology at the University of Kansas.
HERPETOL REV (9):7-8, photos.

ANON
1969. Jumping jacks.
S AFR PANORAMA 14(4):40-41, back cover, photos. (some col.)

ANON
1969. Long Island Herp Society.
INT TURTLE TORTOISE SOC J 3(6):5, photo.

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1969. Prof. Dr. Robert Mertens - 75 Jahre.
AQUARIEN TERRARIEN Z 22(12):384.

ANON
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ARTIS 15(4):cover.

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1969. Poison put to work.
S AFR PANORAMA 14(10):8-13, photos.

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1969. Palaeontology, reptiles of Gondwanaland.
NATURE (LONDON) 224(5224):1059.

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1969. Turtles in Sarawak.
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1969. Nouvelle espece d'Ophidascaris Baylis 1921, parasite du serpent crotale (Crotalus durissus terrificus).
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ARCHER,W.H.
1969. Frog behaviour.
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ARNO,STEPHEN F.
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1969. Reptiles need help in order to survive.
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1969. Behaviour of histones and cytoplasmic basic proteins during embryogenesis of the Japanese newt, Triturus pyrrhogaster.
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ASHLEY,LAURENCE M.
1969. Laboratory anatomy of the turtle. Wm. C. Brown Co. Publ., Dubuque, Iowa. 48 p., 45 fig., 1 tab.

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1969. Etude cytophotometrique de la distribution des acides nucleiques le long des chromosomes metaphasiques de l'amphibien urodele Pleurodeles waltlii Michah.
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(Span, Engl summ)

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1969. Mostly tortoises.
TORTUGA GAZETTE 5(12):3-4.

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1969. Weitere Angaben zur Verbreitung der Echsen in der Gegend von Primorsko in Suedbulgarien.
AQUAR TERR 16(11):384-385.

BLACK,JEFFREY HOWARD
1969. A cave dwelling population of Ambystoma tigrinum marvortium in Oklahoma.
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BLANC,CHARLES P.
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1969. The transfer function of frog myoneural junctions. II. The influence of previous conditions in situ upon the in vitro responses to pulse trains.
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ARNOLDIA 4(27):1-8, 3 fig., 1 tab., 2 pl.

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BULL MUS NAT HIST NATUR PARIS 41(1):117-121.

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1969. Additional records of the eastern garter snake from Nassau County, Long Island.
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PROC KON NED AKAD WETENSCH SER C BIOL MED SCI 72(4): 451-466, 5 fig., 4 tab.

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GEN COMP ENDOCRINOL 13(3):460-467, 5 fig.

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1970. The macroteiid lizards: an osteological interpretation.
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1970. Regulation of glutamate pyruvate transaminase in the amphibian (Rana hexadactyla) kidney and liver homogenates.
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C R ACAD SCI (PARIS) D 270(1):193-195, 4 fig.

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1970. Studies on immuno-electrophoretic separation of Habu venom and its detoxication in vitro.
INT SYMP ANIM PLANT TOXINS 2ND PROGR:88. (abstr)

TAKAHASHI,TOMOKO and AKIRA OHSAKA
1970. Purification and characterization of a proteinase in the venom of Trimeresurus flavoviridis, complete separation of the enzyme from hemorrhagic activity.
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50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 28. (abstr)

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1970. Effects of histamine on the toad spinal cord.
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1970. Toxicity of salivary glands of some Indian snakes.
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BETES NATURE 1970(73):44-46, illus.

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VINEGAR,MARIAN
1970. Comparative aggression in three forms of Sceloporus.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 31. (abstr)

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50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 32. (abstr)

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WASSERMAN,AARON O.
1970. Polyploidy in the common tree toad Hyla versicolor Le Conte.
SCIENCE (WASHINGTON) 167(3917):385-386, 2 fig.

WEBB,ROBERT G.
1970. Another new night lizard (genus Xantusia) from Durango, Mexico.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 32. (abstr)

WEINREICH,DANIEL
1970. Post-tetanic potentiation at the neuromuscular junction of the frog in the presence of tetrodotoxin.
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WELLS,FRANK E.
1970. Guess what's coming to dinner.
MRI QUART 1969(winter):12-15, 18-20, illus.

WERMUTH,HEINZ
1970. Eine Grosskopfschildkroete als Kletterkuenstler.
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WEVER,ERNEST GLEN
1970. The lizard ear: Cordylus, Platysaurus and Gerrhosaurus.
J MORPHOL 130(1):37-56, 19 fig., 1 tab.

WHITE,FRED N.
1970. Symposium on reptilian physiology.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 32-33. (abstr)

WHITFORD,WALTER G.
1970. Comparative ecology of montane and desert populations of Ambystoma tigrinum.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 33. (abstr)

WILBUR,HENRY M.
1970. Ecological consequences of gynogenesis in the Ambystoma laterale complex.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 33-34. (abstr)

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1970. Amastridium, p. 18, In, James A. Peters and Braulio Orejas-Miranda, Catalogue of the Neotropical Squamata. Part I. Snakes. Smithsonian Institution Press, Wash., D.C.

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TULANE STUD ZOOL 16(2):31-99, 31 fig., 11 tab.

WINEGRAD,SAUL
1970. The intracellular site of calcium activiation of contraction in frog skeletal muscle.
J GEN PHYSIOL 55(1):77-88, 5 fig.

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1970. An immunochemical comparison of tadpole and frog hemoglobins.
COMP BIOCHEM PHYSIOL 32(1):89-95, 5 fig.

WORKMAN,J.M., F.E.RUSSELL and M.M.WOOLEY
1970. Use of hyperbaric oxygen in Crotalus venom poisoning.
INT SYMP ANIM PLANT TOXINS 2ND PROGR:95. (abstr)

WORTHINGTON,RICHARD D.
1970. Cranial osteology of the marbled salamander, Ambystoma opacum Gravenhorst.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 34. (abstr)

WRIGHT,C.E.
1970. Is the alligator doomed?
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YANG,C.C.
1970. Biochemical studies on the toxic nature of snake venom.
INT SYMP ANIM PLANT TOXINS 2ND PROGR:95-96. (abstr)

YOUNG,R.S., P.H.DEAL, K.A.SOUZA and O.WHITFIELD
1970. Altered gravitational field effects on the fertilized frog egg.
EXP CELL RES 59(2):267-271, 2 fig.

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ZACCANTI,F. and G.GARDENGHI
1970. Vitellogenesis in Bidderian oocytes after diethylstilbestrol dipropionate treatment on Bufo bufo adult males.
EXPERIENTIA (BASEL) 26(1):98-99, 2 fig.

ZWEIFEL,RICHARD G.
1970. Descriptive notes on larvae of toads of the debilis group, genus Bufo.
AMER MUS NOVITATES (2407):1-13, 9 fig.

ZWEIFEL,RICHARD G.
1970. Dynamics of a small population of Chrysemys picta on Long Island, New York.
50TH ANN MEETING AMER SOC ICHT HERP 26-30 March, 1970. New Orleans, Louisiana 34. (abstr)

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JOURNALS INCLUDED

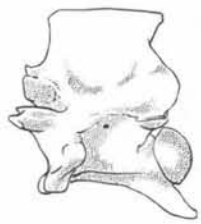
Listed below are the 273 different journals (several issues of some) in which articles relating to amphibians and reptiles were found during this quarter. This list is intended, not only as an indicator of the highly scattered nature of articles pertaining to these animals, but as a warning. It is unlikely that any one library will have all these journals. None of the large medical, biological or biochemical abstracting services cover all of these journals nor does Zoological Record. How can one find them? Can we ignore them? If someone thinks that some at least can be ignored, which ones? If you have any ideas let us know.

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ACTA ANAT 72(3)
ACTA ANAT NIPPON 44(4)
ACTA BIOL CRACOV SER ZOOL 12(1-2)
ACTA BIOL MED GER 22(5-6)
ACTA PHYSIOL PHARMACOL NEER 15(4)
ACTA ZOOL CRACOV 14(7), (9)
ACTA ZOOL PATHOL ANTVERPIENSIA 48
AFR WILDLIFE 23(1), (2), (3), (4)
AGR HANDB suppl 231
ALLATTANI KOEZLEMENYEK 56(1-4)
AMER J ANAT 126(1), (4)
AMER J PHYSIOL 217(6), 218(3)
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AMER MUS NOVITATES (2407)
AMER SCI 57(4), 58(1)
ANAT REC 165(4)
ANIM KINGDOM 72(5)
ANN ENDOCRINOL 30(6)
ANN FAC SCI UNIV DAKAR 22(2)
ANN GENET 12(3)
50TH ANN MEETING AMER SOC ICHT HERP 26-30 MARCH, 1970.
NEW ORLEANS, LOUISIANA
ANN N Y ACAD SCI 167(1)
ANN PARASITOL HUM COMP 44(1)
ANNEE BIOL (4), 8(11-12)
ANNOT ZOOL JAP 42(4)
AQUA TERRA 6(11), (12), 7(2)
AQUAR 40(7), (8)
AQUAR MAG 4(1), (2)
AQUAR TERR 16(5), (10)
AQUARIEN TERRARIEN Z 22(12), 23(1), (2)
AQUARIST AND PONDKEEPER 34(7), (8), (9), (10)
ARCH BIOL (LIEGE) 80(3)
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ARTIS 15(4)
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BETES NATURE (70), (71), (72), (73)
BIOCHEM J 115(5)
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BIOL ZENTRALBL 88(5)
BIOL ZH ARM 22(8)
BIOLOGIST (PHI SIGMA SOC) 51(3)
BIOPHYS J 10(2)
BLIJDORP GELUIDEN 17(12)
BRAIN BEHAV EVOL 2(1)
BRAIN RES 17(3)
BREVIORA (338), (343)
BRIT J HERPETOL 4(5)
BRIT J PHARMACOL 36(2)
BROOKFIELD BANDARLOG (37)
BUL INST CERCET PROIECT PISCIC 28(4)
BULL FLA STATE MUS BIOL SER 14(3)
BULL INST FOND AFR NOIRE (A) 31(3)
BULL MUS COMP ZOOL HARVARD UNIV 138(6)
BULL MUS NAT HIST NATUR PARIS 41(1), (2)
BULL S CALIF ACAD SCI 68(1), (4)
BULL SOC GEOL FR (7), 10(6)
BULL SOC HIST NATUR AFR NORD 59(1-4)
BULL SOC ZOOL FR 94(2)
BULL WILDLIFE DIS ASS 5
BYULL EKSP BIOL MED (5)
C R ACAD SCI (PARIS) D 268, 270(1), (2), (3), (4)
C R ASS FR AVAN SCI BIOL AGRON 4
C R SEANCES SOC BIOL FILIALES 163(4), (6), (7)
CAN FIELD NATUR 83(3)
CAN J ZOOL 47(6)
CEYLON ASS ADV SCI ANN SESSION 25th
COMP BIOCHEM PHYSIOL 31(4), (5), (6), 32(1), (2), (3)
COMUN ZOOL ROMANIA 1969
CONSERV NEWS 35(1)
COPEIA 1970(1)
CURR SCI 38(15), (18), (21), (22)
CYTOGENETICS (BASEL) 8(6)
DENISON J BIOL SCI 7(1)
DEVELOP BIOL 20(6)
DISCOVERY (NEW HAVEN) 5(1)
DISS ABSTR B 29(11), 30(2)
DOKL AKAD NAUK SSSR 188(1-3), 189(1-3)
ECOLOGY 50(4)
EESTI LOODUS 1969(12)
ENDEAVOUR 29(106)
ENDOCRINOLOGY 86(2)
ENGELHARDTIA 2(2), (3), (4)
ENVIRON SOUTHWEST (419)
EVOLUTION 23(4)
EXP BRAIN RES 9(1)
EXP CELL RES 57(2-3), 58(2-3), 59(1), (2)
EXP EYE RES 8
EXPERIENTIA (BASEL) 25(11), (12), 26(1)
FIELD 234(6088), (6098)
FIZIOL ZH SSSR IM I M SECHENOVA 55(11), (12)
FLA NATUR 42(4-B), 43(1)
FLA WILDLIFE 23(9)
FRONTIERS 34(3)
GAME BULL (WASH DEPT GAME) 22(1)
GEGENBAURS MORPHOL JAHRB 113(3)
GEN COMP ENDOCRINOL 13(3), suppl
HERCYNIA 6(2)
HERPETOL REV (9)
HERPETOLOGICA 25(4)
INMUNOLOGY 16(1)
INT J NEUROPHARMACOL 8(6)
INT SYMP ANIM PLANT TOXINS 2ND PROGR:
INT TURTLE TORTOISE SOC J 3(6)
IRAQ NATUR HIST MUS PUBL (26)
ISRAEL J ZOOL 18(1)
IUCN PUBL (N.S.) suppl 20
IZV AKAD NAUK TURKM SSR SER BIOL NAUK (4)
J AMER STATIST ASS 64
J ANIM MORPHOL PHYSIOL 16(1)
J BIOL SCI 11(1-2)
J CELL SCI 5(1)
J CHROMATOGR 44(1)
J EMBRYOL EXP MORPHOL 22(2)
J ENDOCRINOL 45(4)
J EXP ZOOL 171(4), 172(2), (3)
J GEN PHYSIOL 55(1), (2)
J HELMINTHOL 43(3-4)
J HERPETOL 3(3-4)
J LIPID RES 10(4)
J MAMMALOGY 51(1)
J MOL BIOL 45(2), 46(3)
J MORPHOL 129(4), 130(1)
J NAT RES COUNC THAILAND 5(1-4)
J NEUROPHYSIOL 32(6), 33(1)
J PARASITOL 55(6)
J PHARM SCI 58(10)
J PHYSIOL (CAMBRIDGE) 203(1), 204(2), (3), 205(1), (2)
J PROTOZOOL 16(4)
J SOC BIBLIOGR NATUR HIST 5(3)
J TENN ACAD SCI 44(4)
J ULTRASTRUCT RES 29(3-4), 30(1-2)
J WASH ACAD SCI 59(7-9)
J WILDLIFE MANAGE 33(4)
J ZOOL (LONDON) 160(1)
JAP J ECOL 19(2)
JAP J PARASITOL 18(3)
JAP J PHYSIOL 19
KANSAS SCH NATUR 16(2)
KINGFISHER 4(4)
L I FORUM 32(5)
LIFE SCI 8(22), (24)
LORIS 11(5)
MAINE FIELD NATUR 26(1)
MAMMAL CHROMOSOMES NEWSLETT 10(4)
MASS AUDUBON 55(2)
MASS WILDLIFE 21(1)
MISS GAME FISH 32(6)
MRI QUART 1969(Winter)
N Y TIMES Jan 18, 1970
NARRAGANSETT NATUR 11(1)
NASA TECH TRANSL (F 12-508)
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NATUR BELG BULL MENS 50(10)
NATURWISS MED 6(28)
NATUURHIST MAANDBLAD 58(11)
NATUR HIST 79(1)

NATUR VERDEN 1969
NATURE (LONDON) 224(5215), (5219), (5223), (5224), (5226), 225(5228), (5235), (5236)
NATURE SCI 7(9), (10)
NATURWISS MED 6(29)
NATURWISSENSCHAFTEN 56(11), (12)
NAT CANCER INST MONOGR (32)
NAUNYN-SCHMIEDEBERGS ARCH PHARMAKOL EXP PATHOL 264(2)
NEOTROPICA 15(48)
NEPHRON 6
NEW SCI 44(679)
NIGERIAN FIELD 34(3)
NORTHWEST SCI 43(4)
NOTES AFR (123)
OECOLOGIA (BERLIN) 4(1), (2)
OKAJIMAS FOLIA ANAT JAP 46(5)
OKLA RIVER BASIN SURV ARCHAEOL SITE REP (13)
ONT NATUR 1969(4)
OOST WEST 62(11)
OPUSCULA ZOOL (BUDAPEST) 9(2)
ORYX 10(2), (3)
PALAEONTOLOGY 12(4)
PARASITOLOGY 59(4)
PFLUEGERS ARCH EUROPE J PHYSIOL 312(4), 313(1), (3), (4)
PHYSIOL REV 50(1)
PHYSIS REV ASSOC ARGENT CIENC NATUR 29(78)
POSTILLA (135), (142)
PROC INDIANA ACAD SCI 78
PROC KON NED AKAD WETENSCH SER C BIOL MED SCI 72(4)
PROC LA ACAD SCI 32
PROC N Z ECOL SOC (16)
PROC NAT ACAD SCI U S A 65(2)
PROC ROY SOC EDINBURGH SECT B BIOL 70(4)
PROC SOC EXP BIOL MED 132(2), 133(1)
PROC WEST FOUND VERTEBRATE ZOOL 1(6)
PUBL MUS MICH STATE UNIV BIOL SER 4(6)
QUART J FLA ACAD SCI 32(1)
QUART REV BIOL 44(4)
QUEENSLAND NATUR 19(4-6)
REP INVEST ILL STATE MUS (14), (16)
REP INVEST SOUTH DAKOTA GEOL SURV (99)
RES BULL PANJAB UNIV SCI 19(3-4)
REV ACAD COLOMBIANA CIENC EXACTAS FIS NATUR 13(50)
REV BRAS PESQUISAS MED BIOL 2(1)
REV FAC CIENC EXACTAS FIS NATUR UNIV NAC CORDOBA 29(3-4)
REV LATINOAMER MICROBIOL PARASITOL 11(4)
REV ROUM BIOL SER ZOOL 14(1), (4), (5)
REV ZOOL BOT AFR 80(3-4)
RHODESIA SCI NEWS 3(10)
S AFR PANORAMA 14(4), (10)
SCI NATURE (96)
SCI PUBL SCI MUS 1(4)
SCI TECH AEROSP REP 8(4)
SCI WORLD 19(10)
SCIENCE (WASHINGTON) 167(3917)
SCIENCES (N Y ACAD SCI) 10(2)
SENCKENBERGIANA BIOL 50(3-4)
SEROL MUS BULL (42)
SIERRA CLUB BULL 54(10)
SILLIMAN J 16(3)
SMITHSONIAN HERPETOL INFORM SERV (17)
SOUTHWEST NATUR 14(3)
SPEC PUBL S W A SCI SOC (10)
SPOTS AND STRIPES 6(3)
STUD FAUNA CURACAO CARIBB ISL 30(114)
SYST ZOOL 18(4)
TENN CONSERV 36(1)
TEX J SCI 21(1), (2), (3)
TEX PARKS WILDLIFE 27(12), 28(2)
TIERREICH 90
TISSUE CELL 1(3)
TORREIA (HAVANA) (8)
TORTUGA GAZETTE 5(12), 6(1)
TOXICON 7(3)
TRANS GULF COAST ASS GEOL SOC 19
TRANS KANS ACAD SCI 72(1)
TRANSPLANTATION 8(3)
TROP FISH HOB 18(4)
TSITOLOGIYA 11(9), (10), (11)
TULANE STUD ZOOL 16(2)
TURTOX NEWS 47(9)
UMSCH WISS TEC 69(24), 70(4)
UNDERWATER NATUR 6(2)
UNIVERSUM 25(1)
UZB BIOL ZH (5)
VA J SCI 20(3)
VA(NCOUVER) AQUAR NEWSLETT 13(6)
VERH KON NED AKAD WETENSCH AFD NATUURK TWEEDE REEKS 58(5)
VESTN MOSK UNIV SER VI BIOL POCHOVED 1969(1), (5)
VICTORIA'S RESOUR 11(4)
VIERTELJAHRESSCHR NATURFORSCH GES ZURICH 114(3)
VISION RES 9(11), (12)
WEST AUST NATUR 11(4)
WILDLIFE AUST 6(4)
WILDLIFE N C 33(12), 34(2)
WILHELM ROUX ARCH ENTWICKLUNGSMECH ORGANISMEN 163(4)
WILSON BULL 81(4)
YAKUGAKU ZASSHI 89(8)
Z MIKROSK-ANAT FORSCH 81(1)
Z NATURFORSCH 24(10), (12)
Z TIERPSYCHOL 26
Z VERGL PHYSIOL 65(1), (4), 66(3)
Z VERS 11(5-6)
Z ZELLFORSCH 101(4), 102(2), (4)
ZOOL ANZ 182(5-6), 183(3-4)
ZOOL BIDRAG FRAN UPPSALA 38
ZOOL GARTEN (NF) 37(1-3)
ZOOL J LINN SOC 48(4)
ZOOL JAHRB ABT ANAT ONTOGEN TIERE 86(4)
ZOOL MAG 78(8), (9)
ZOOL MEDED RIJKSMUS NATUUR HIST LEIDEN 44(4), (5), (9)
ZOOL ZH 48(11), (12), 49(1)
ZOOLOGICA (STUTTGART) (117)





UNREVIEWED-UNEDITED COMMUNICATIONS

Chromosomes of the Sunbeam Snake, Xenopeltis unicolor Reinwardt (Reptilia: Xenopeltidae)

Charles J. Cole and Herndon G. Dowling

The Oriental snake Xenopeltis unicolor has a strange combination of morphological features. Some of these indicate a primitive or generalized status, others are characteristic of "advanced" snakes. Further, none of the details of skull structure or scutellation suggests close relationship with any other Recent snake.

As a result, Xenopeltis has held unique taxonomic status for more than 100 years. First placed in a monotypic taxon by Bonaparte (1845), with the two exceptions mentioned below, it has been maintained as the sole representative of the family Xenopeltidae (Cope, 1864: 230). Only Romer and Hoge have suggested placement in other families: Romer (1956: 570) in Aniliidae, Hoge (1964: 32) in Boidae. Recent authors have not followed either allocation (e.g., Underwood, 1967: 9; Stimson, 1969).

Because the relationships of Xenopeltis unicolor remain in doubt, we present a description of its karyotype. Although based on only a few dividing cells from one individual, the taxonomic importance of the karyotype outweighs the deficiencies of the preparation.

MATERIALS AND METHODS

The snake, an adult male, was purchased from a dealer by Herpetological Information Search Systems. Approximately 0.05 ml. of whole blood obtained by means of direct cardiac puncture immediately was placed in a vial of Difco TC Chromosome Microtest Medium, which had just been activated by the addition of Difco TC Chromosome Microtest Reconstituting Fluid. This culture was incubated for 76 hours at 30 C., during which time resuspension of the cells was accomplished twice daily by gently swirling the vial. After 71 hours, one vial of Difco TC Chromosome Microtest Arresting Solution was mixed into the culture.

Chromosome preparations were made by means of the hypotonic citrate, air-dried technique used by Patton (1967), and stained with Giemsa's Blood Stain. Every square micron of each of the resulting microscope slides was scanned in search of dividing cells suitable for examination. The chromosome terminology is the same as that used by Cole (In press).

The specimen examined is No. 104370 in the herpetological collection of the American Museum of Natural History (AMNH).

RESULTS AND CONCLUSIONS

The chromosomes of only six cells were clear enough for karyotype analysis, and only one of the metaphase-spreads could be considered photogenic. All six cells at metaphase had some degree of overlap of chromosome arms, and some exhibited particularly poor spreading, differential staining, and/or chromosome breakage. Nevertheless, three cells exhibited virtually the same chromosomes, including such details as centromere position, and thus these complements represent the modal karyotype described below. Of the remaining three cells, no two exhibited the same deviant condition, and what could be most clearly observed in all of them was compatible with the karyotype described.

The modal karyotype of this individual of Xenopeltis unicolor includes a diploid number of 36 chromosomes ($2n = 36$), with 16 macrochromosomes and 20 microchromosomes. The chromosomes are arranged in pairs and numbered in order of decreasing length (Fig. 1). Of the macrochromosomes, numbers 1, 3, and 4 are metacentric or essentially so, number 2 is clearly submetacentric, numbers 5 and 6 are subtelocentric with very small short arms, and numbers 7 and 8 are subtelocentric to telocentric. Shapes of the microchromosomes cannot be resolved clearly in most cases. Nevertheless, at least one pair of them (the largest) is metacentric to submetacentric, and most of the others appear to be telocentric. The metacentric and submetacentric macrochromosomes (nos. 1-4) are individually recognized with ease; the remaining macrochromosomes and microchromosomes are not. No secondary constrictions were observed. None of the pairs of chromosomes is obviously heteromorphic, which is not surprising inasmuch as the specimen is a male. In all

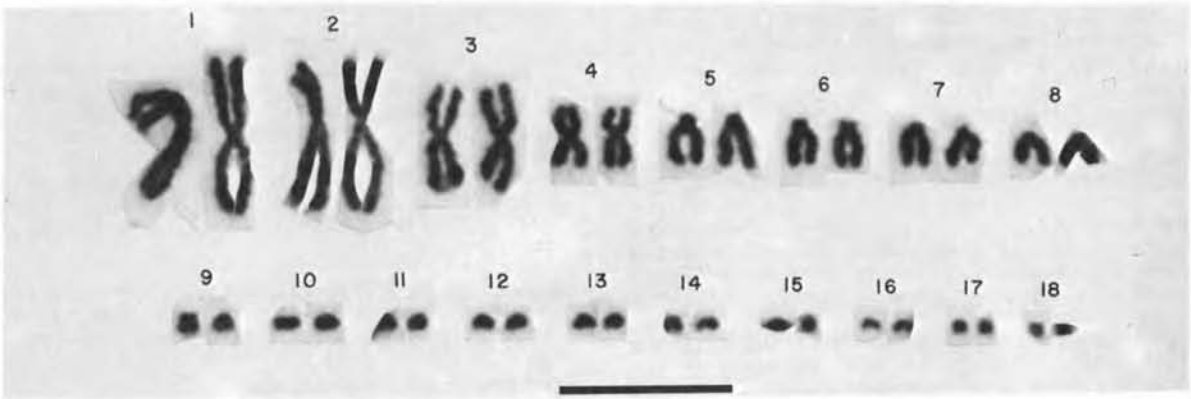


FIG. 1. Representation of the karyotype ($2n = 36$) of a male specimen of Xenopeltis unicolor (AMNH 104370). See text for description. Line represents 10 micra.

species of snakes known to possess heteromorphic pairs of sex chromosomes, the female is the heteromorphic sex (Becak and Becak, 1969).

The karyotype described for Xenopeltis unicolor (Fig. 1) is virtually identical to that of several boids, including Boa constrictor, Epicrates cenchria, Eunectes murinus, and Python molurus (see Becak, 1965, 1968; Singh, Sharma, and Ray-Chaudhuri, 1968). These karyotypes are similar not only in chromosome numbers (2n, macrochromosomes, and microchromosomes), but also in position of the centromere of individual chromosomes. Although a diploid number of 36 chromosomes occurs in many species of snakes in a variety of families, a karyotype such as that in Xenopeltis unicolor and in the boids mentioned above has not been found in any other snake. And considering that the females of these boids do not possess obviously recognizable sex chromosomes, we suspect that this is the case in Xenopeltis unicolor also.

In possessing chromosomes similar to those of B. constrictor, E. cenchria, E. murinus, and P. molurus, Xenopeltis unicolor likewise is karyotypically different from the remaining species of boids whose karyotypes have been described. In Eryx jaculus and Eryx johni there are 18 microchromosomes instead of 20, although the number and morphology of the macrochromosomes appears to be approximately the same as in the other boids (Werner, 1959; Singh, Sharma, and Ray-Chaudhuri, 1968). In Corallus caninus there is a diploid number of 44 chromosomes, including 24 macrochromosomes that are telocentric or nearly so and 20 microchromosomes (Becak, 1965, 1968). Thus, a phylogenetic tree based on chromosome number and morphology would differ widely from the usual one in which Xenopeltis is placed in a monotypic family and the "boas" (Boa, Corallus, Epicrates, Eryx, Eunectes) are placed in a family or subfamily separated from that of the "pythons" (Python).

The low mitotic activity observed in this culture may be attributed in part to undernourishment or some other malady. The animal was received in the laboratory two months before it was processed; we know nothing of its care prior to that. It refused food in our laboratory and died approximately three weeks following cardiac puncture. We do not attribute the snake's death to the blood sampling because numerous other animals so sampled, including those sampled considerably earlier, show no ill effects, and this individual showed obvious symptoms of disease.

Similar cultures of whole blood from healthy snakes, however, often produce little better results. Thus, perhaps this technique is best used only in those cases where the continued life of the snakes is required for purposes of higher priority. One cannot help but wonder whether the sparse mitotic activity observed in these experiments reflects the reason that many investigators of reptilian karyotypes (and others) do not include statements on sample size in their reports, and in part why snake karyotypes appear to be relatively extremely conservative.

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UNREVIEWED-UNEDITED COMMUNICATIONS

Relationship of the Neotropical Snakes *Hydrodynastes bicinctus* and *Cyclagras gigas*

Herndon G. Dowling & Frances W. Gibson

In a recent paper Peters (1970) reviewed the nomenclature of the two species of South American colubrid snakes that have variously been placed in the genera *Cyclagras*, *Dugandia*, *Hydrodynastes*, and *Lejosophis*. He determined that Hoge's previous review (1958) had been based in part on incomplete or erroneous information, and that the species originally named *Xenodon gigas* Dumeril (1893: 479, pl. 1), should be called *Cyclagras gigas*, rather than *Lejosophis gigas* as indicated by Hoge. Both authors agreed that the other species should be known as *Hydrodynastes bicinctus*. These names are used in the later paper by Peters & Orejas-Miranda (1970: 78, 127).

Peter's appears to have interpreted the nomenclature correctly. The result, however, is to maintain the separation of two similar snakes in monotypic genera. We wish to point out the apparent relationships of these two species.

Both are large, rather stout-bodied snakes with small eyes that have round pupils (Fig. 1). Their color patterns are similar, paired

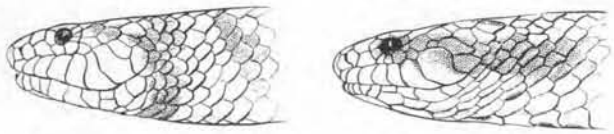


FIG. 1. Heads of *Hydrodynastes bicinctus* (AMNH 60822) and *Cyclagras gigas* (AMNH 60031). Note common presence of suboculars.

black crossbands on a light brown background. The overall appearance is so close that the two species are often confused in collections, and both are known as "South American Water Cobras" to commercial snake dealers.

Some of the basic information is given in tabular form (Table 1). Except for the presence of apical pits in *C. gigas* and their absence in *H. bicinctus*, the scutellation is virtually identical. The two species agree in such unusual features as the presence of suboculars, as well as in more general ways. The maxillary dentition is similar, dicrantarian with two enlarged teeth posterior to the diastema (Fig. 2), as are the other features of dentition and osteology. The hemipenes are similar in all important respects (Fig. 3).

APICAL SCALE PITS. Evidently these two species have been maintained in different genera mainly because of Boulenger's (1894) major reliance on the "key character" of apical pits. Because *H. bicinctus* lacked them, it was placed in his composite genus "*Urotheca*."

Recent observation suggests that the presence or absence of apical scale pits is not a characteristic of high phyletic importance. Conant (1961) discussed its inconsistency among American natricines, Vincent Maglio (*in litt.*) found it to be uncorrelated with other morphologic characters in West Indian colubrids, and Charles W. Myers (pers. comm.) found pits to be present in some individuals of certain species of *Rhadinaea* but absent in most.

TABLE 1

SELECTED FEATURES OF TWO COLUBRID SNAKES

FEATURES	H. BICINCTUS	C. GIGAS
Size	Large (2m+)	Large (2m+)
Proportions	Stout	Stout
Scutellation		
Head Scutes	Normal	Normal
Suboculars	Present	Present
Dorsals	Smooth	Smooth
Apical Pits	Absent	Present (2)
Rows	19-21	19
Reduction	Paravertebral	Paravertebral
Ventral Scutes	168-192	153-170
Anal Scute	Entire	Entire
Subcaudals	Paired	Paired
Number	69-94	60-87
Maxillary Teeth	Dicrantarian	Dicrantarian
Number	12-13 + 2	16-17 + 2
Hemipenis		
Form	Bilobed	Bilobed
Type	Subcapitate	Subcapitate
Sulcus	Bifurcate	Bifurcate
Chromosomes (2n)	24	24

DENTITION & OSTEOLOGY. The skulls of *H. bicinctus* and *C. gigas* show no unique features (Dumeril, 1853: pl. 1; Jan & Sordelli, 1881: pl. 2). Both have relatively small nasal bones and large supratemporals and quadrates. The skull of *H. bicinctus* appears to be somewhat more massive, with slightly longer supratemporals. The maxillary dentition is dicrantarian in both (Fig. 2), with *C. gigas* having more pre-diastemal teeth, 16-17 versus the 12-13 in *H. bicinctus*. The vertebrae are essentially identical.



FIG. 2. Maxillary bones and dentition of *Hydrodynastes bincinctus* (AMNH 60798) and *Cyclagras gigas* (AMNH 64899).

HEMIPENIS. The observations on the hemipenes were not made on ideal material. Both specimens were everted from individuals that had been long-preserved with the hemipenes in the inverted position. Such conditions are more likely to suggest differences through artifacts of preparation rather than similarities, however.

Both are bilobed hemipenes with bifurcate centrifugal sulcus. As pointed out by Neill (1964: 197), therefore, *H. bicincta* is definitely "xenodontine" rather than "colubrine," as supposed by Dunn (1944: 70). The

lobes have papillate calyces and the basal portions are spinose. We call them "subcapitate" because, whereas the capitulum is distinct on the asulcate side, it is much less so on the sulcate surface, appearing to be interrupted by the two branches of the sulcus and the intervening space.

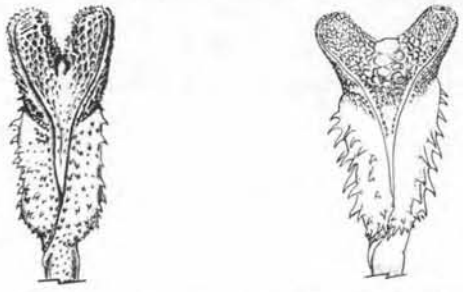


FIG. 3. Everted hemipenes of Hydrodynastes bicinctus (HGD 551) and Cyclagras gigas (HGD 565). That of H. bicinctus has smaller and more numerous spines; most of the other apparent differences are due to accidents of preparation.

The hemipenes differ in a few respects. The apparent difference in the spreading of the lobes is undoubtedly an artifact of preparation. The differences in length of four subcaudals (11 in H. bicinctus, 15 in C. gigas) may be a real difference, or may also be an artifact. However, the organ of H. bicincta does have smaller and more numerous spines, a relatively minor difference.

KARYOLOGY. Though chromosome counts are known for only about 50 colubrid species (Becak & Becak, 1969), we believe the agreement of these two species in chromosome number to be an important indication of close relationship. The diploid number of 24 is the lowest number reported in the Serpentes, and is shared with no other species (the nearest are species within the genera Erythrolamprus, Liophis, and Philodryas, all of which have 28). Further, as described and illustrated (Becak & Becak, 1969: 252, fig. 10-11), the karyotypes are virtually identical in the two, differing only in whether Chromosome 8 is metacentric (C. gigas) or submetacentric (H. bicinctus). Because Chromosome 8 is about at the limit of good resolution (1-2 micra), even this difference may be an artifact of observation.

SUMMARY & CONCLUSIONS

We believe that the identity or great similarity of H. bicinctus and C. gigas in body size and form, color and pattern, scutellation, dentition, hemipenis, and karyotype discounts the importance of apical scale pits in one and their absence in the other. None of the other differences noted appear to be of more than specific value.

We suggest, therefore, that these snakes be placed in the same genus to indicate their evident close relationships (this allocation was anticipated by Becak & Becak, 1969). Thus, the name Cyclagras Cope (1885: 185) joins Lejosophis Jan, 1863, and Dugandia Dunn, 1944, in the synonymy of Hydrodynastes Fitzinger (1843: 25). The included species are H. bicinctus (Hermann, 1804: 276), the type-species, which ranges from Amazonian Colombia to the Guianas and Amazonian Brazil, and H. gigas (Dumeril, 1853: 479), which is known from Argentina, Brazil, and Bolivia.

We wish to thank C. J. Cole, I. Gilboa, and R. G. Zweifel for reading the manuscript. This is contribution No. 19 of the Genera of Reptiles Project, which is partially supported by the National Science Foundation (NSF-OSIS GN-707).

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[Received 13 March 1970.]

book review

THE TAILED AMPHIBIANS OF EUROPE. By J. W. Steward. 1969. David & Charles (Publishers) Ltd., South Devon House, Railway Station, Newton Abbot, Devon, England. 180 pp., 13 plates, 29 drawings, text figs. 1-5, 16 maps. 42 shillings (= $5.04).

This work coming into print so soon after the appearance of Robert Thorn's "Les Salamandres d'Europe, d'Asie, et d'Afrique du Nord", leads naturally to a direct comparison between the latter and the work here reviewed. The advantages of Steward's book are that it is much cheaper ($5.04 versus $17.10 for Thorn's), and it is in English. However, the content of "Les Salamandres. . ." is superior, Thorn having included all the essential synonymies, a more detailed and scientific description of each form, and useful usable keys in contrast to the Steward book.

Some disappointing facets of "The Tailed Amphibians of Europe" are, for example, the following misleading or incorrect statements: (1) "With few exceptions they [Order Caudata] are born of eggs laid in water, pass through an aquatic larval state. . .etc."; his "few exceptions" constitute more than half of the living salamanders of the world [all members of the tribes Plethodontini and Bolitoglossini of the family Plethodontidae undergo direct development; these make up 161 of the 309 salamander species]. (2) "Plethodontidae - over 50 species. . ." whereas, there are currently 190 species recognized.

No explanation is given for the inclusion of Hynobius keyserlingii and exclusion of Mertensiella and Neurergus of Turkey and adjacent countries; the latter two genera range closer to (or as close to) continental Europe than does the former species. Inexplicably, he does show the ranges and gives accounts of some subspecies of Triturus and Salamandra in Turkey.

There is much useful information concerning food, habits, and habitat, as well as general descriptions of each European salamander covered. The photographs, drawings and figures are mostly excellent, so most herpetologists will want to add this work to their library.

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****

reprints

NEW FACSIMILE REPRINTS

Anatome Testudinis Europaeae by L. H. Bojanus. A facsimile reprint of this classic in turtle anatomy was issued by the SSAR in February 1970. Originally issued in an edition of 80 copies at Wilna, Lithuania, in 1819-1821; 250 pages, 41 plates (folio). The reprint includes an introduction by Alfred S. Romer. Prices to SSAR members, $13.00 paperbound, $15.00 cloth; price to institutions and non-members, $18.00 and $20.00 respectively.

* * *

Sowerby and Lear's Tortoises, Terrapins and Turtles, although first issued in 1872, remains the finest atlas of turtle illustration ever produced. In addition to 60 8 1/2 x 11-inch plates, the reprint will include an introduction by Ernest Williams which brings the nomenclature up-to-date. Prices to individuals $9 paperbound, $10 clothbound; institutions, $14 and $15, respectively. To be issued fall 1970.

* * *

Camp's Classification of Lizards, the foundation for modern lizard systematics, has long been out-of-print. The reprint will include a preface by Charles L. Camp, an introduction by Garth Underwood analyzing Camp's work in view of recent research, and an index. Prices to individuals $11 paperbound, $12 clothbound; institutions $16 and $17 respectively. To be issued winter 1970-1971.

* * *

Books may be ordered from Dr. Henri C. Seibert, Publications Secretary, SSAR, Department of Zoology, Ohio University, Athens, Ohio 45701, U.S.A. A pricelist of other Facsimile Reprints in Herpetology, as well as other Society publications, may be obtained upon request.

****

HERPETOLOGISTS RECORD

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A CORRECTION:

ROZE, JANIS A. 1969. Una nueva coral falsa del genero Scaphiodontophis (Serpentes: Colubridae) de Colombia. CALDASIA 10(48): 355-363.

On page 356, line 9: FOR "(43-46)", READ "(43-56)".

On page 360, line 16: AFTER the word "ápice." and BEFORE the sentence which begins, "Hay diferencia..." INSERT A NEW SENTENCE: "La región entre la novena y décima subcaudal presenta cálices pequeños con espinas pequeñas."

****

****

members desiderata

****

PAUL J. YUHAS (429 Robins Street, Roselle, New Jersey 07203) would like to obtain specimens of the "western forms of Ambystoma tigrinum (mavortium, diaboli, etc.)."

CHARLES J. COLE (Dept. Herpetology, American Museum of Natural History, New York, N. Y. 10024) is particularly anxious to receive any living representatives of snakes of the Tantilla planiceps complex, which would be instrumental for the revision of that group being conducted jointly by him and Laurence M. Hardy (Dept. Biol. Sci., Louisiana State U, Shreveport, La. 71105).

We regret to inform you that our colleague

F. J. MITCHELL

Senior Curator of Vertebrates,
died on 23rd February, 1970.

SOUTH AUSTRALIAN MUSEUM

(A postcard received 8 May 1970)

ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rarities, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be typewritten on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $16.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N.Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

ILLUSTRATIONS. The author's name, abbreviated title of the manuscript, figure number, and the notation "Top" should be penciled lightly on the back of all illustrations. Number the captions consecutively and list these on a separate page.

Line-cuts are photo-offset directly with the text, and should have widths of 4.4 inches (one column) or 9.3 inches (two columns). Each inch of illustration length equals six lines of text (full page copy length is 13.1 inches). Line cuts are reduced 25 per cent in processing.

Photographs and drawings reproduced by half-tone plates are handled separately but should be planned for one-column or two-column reproduction.

A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook for Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.

UNREVIEWED-UNEDITED COMMUNICATIONS

"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

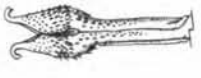
Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

This section is supported entirely by its authors and their sponsors. Page charges pay the costs of publication, distribution, and 100 author's reprints. Illustrations may be included but must be reduced to proper dimensions (see Advice to Authors).

Page charges are: $20 for a single page (155 lines of 40 characters and spaces); $40 for the two-page maximum (313 lines). Include an allowance for the title, and four lines for the author's name and address. [Send check for proper amount with manuscript.]





herpetological REVIEW

VOLUME 2, NUMBER 1

MARCH 1970

After Homo sapiens what?

"Some 300 generations have passed since man began a new life, tilling the earth and settling in villages. Now, within a single generation, man will become an urban species, with over half of the six billion persons in A.D. 2000 living in hivelike cities. Thus may end the 30,000-year span of *Homo sapiens* and begin the era of *Homo convivens*, a new communal species that would control its reproduction and manage its ecosystem — the biosphere."

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This dramatic new look at human evolution appears in a 32-page report on mankind from the January issue of *Natural History* Magazine. It's called "The State of the Species." Its pages span the ages of man from his beginning four million years ago to his future here on earth.

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- **Man's cultural heritage may be two million years older than many scientists project (from an anthropologist with a new theory on human evolution)**
- **Man had better be content with life on earth because he's not going to be able to live in outer space**
- **Waste — not population growth — causes pollution**
- **People starve when they can have food (from the most comprehensive study on malnutrition to date, not yet published)**
- **One billion more people in 15 years (United Nations projections of world-wide growth in five-year intervals to 1985)**
- **The changing Chinese: birth rate declining, contrary to popular opinion**

This report is different, unusual, provocative reading. Like *Natural History* Magazine.

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Diversity is the name of the game this magazine plays, so expect a surprising range of material. Margaret Mead on the possibility for survival. Christmas in the Kalahari desert. How the Soviet plan to transform nature. Getting along with a grizzly. The vital importance of properly "aging" our water supply. Life and death in the seal harems of Alaska. The most celebrated dog case ever tried in Johnson County, Missouri or the world. Initiation rites in New Guinea.

Full color photographs capture the drama of this reportage.

Every month there's "Sky Reporter," with celestial events charted by Dr. Thomas D. Nicholson, formerly head of the Hayden Planetarium and now Director of The American Museum of Natural History. Here is an easy introduction to stargazing along with fascinating facts about astronomy.

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Herpetological Review

VOLUME 2, NUMBER 1. MARCH 1970

CONTENTS

ARTICLES

4 THE ECONOMICS OF HERPETOLOGICAL PUBLICATION, by Herndon G. Dowling.
Rising costs are requiring reexamination of financing methods.

27 LYSTROSAURUS AND CONTINENTAL DRIFT.
Recent Antarctic finds "confirm" theory.

28 THE GERMAN HERPETOLOGICAL SOCIETY, by Harry W. Greene.
This European society provides many services for home members.

UNREVIEWED-UNEDITED COMMUNICATIONS

6 PROPOSAL OF AN AVANT-GARDE MEDIUM OF PUBLICATION.

DEPARTMENTS

2 EDITORIAL

3 LETTERS
H. L. Freeman on Graptemys nigrinota delticola.

7 CURRENT HERPETOLOGICAL TITLES

28 MEETINGS AND SOCIETIES

29 INDIVIDUALS AND INSTITUTIONS

30 BOOK REVIEWS
A. H. Brame on Sierra Nevada amphibians.
New fascimile reprints.

31 CONSERVATION NEWS
1969 was a big year for crocodilians.

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New York, New York 10024

* SUBSCRIPTIONS Members of the Society for the Study of Amphibians and Reptiles receive Herpetological Review without additional charge. Individual subscriptions to non-members and institutions are $4 per year.

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EDITORIAL

There are a number of new features in this issue of HERPETOLOGICAL REVIEW. They all have the same aim: to provide a medium of intercommunication between the people who have, as a common bond, an interest in amphibians and reptiles, but whose precise interests and approaches are widely different. Besides the professional herpetologists, there are ecologists, embryologists, geneticists, physiologists, and other professional biologists who utilize amphibians and reptiles (or, perhaps one amphibian or one reptile) in their studies. In addition, there are many people who are interested in these animals as part of the local fauna, or as pets. Much of the knowledge that is common to the membership of one of these separate fields is unknown to the others.

Workers in a field not only need to know what their fellows are doing, but also what is going on in allied fields that might affect their work and interests. A newsletter that would be common to the many diverse groups and societies might solve this problem. I propose to make HERPETOLOGICAL REVIEW this newsletter.

There are a number of approaches to intercommunication. One that was previously initiated is the CURRENT HERPETOLOGICAL TITLES section, which lists articles from all these fields. You will note that "Titles" is printed as a center section in this issue, making it possible to remove it without damaging the remainder of the publication. If we make HERPETOLOGICAL REVIEW a bimonthly publication, the "Titles" list will be of modest dimensions, and easier to scan.

The MEETINGS AND SOCIETIES and the INSTITUTIONS AND INDIVIDUALS sections are designed to let people know what their fellows are doing and what options are open to them in terms of meetings, courses, and other activities. BOOK REVIEWS and the advertisements of books and products serve similar functions. CONSERVATION is also a field that is obviously of common interest, and is included here as a separate section. A LETTERS section has been available to only a minority (e.g., members of the International Turtle and Tortoise Society). One is included here to give a place for an individual to express himself in regard to the activities of other workers.

The most exciting section to me (though it may cause some controversy) is a proposed UNREVIEWED-UNEDITED COMMUNICATIONS section. The SSAR has been a prime innovator in the field of information dissemination. It seems only right that it should initiate this new form of rapid communication. -- HGD.

LETTERS

[LETTERS concerning articles in this publication, the Journal of Herpetology, Copeia, Herpetologica, or other journals, will be published without editorial intervention if deemed to be of interest. HGD.]

A comment on: A NEW SUBSPECIES OF THE TURTLE GRAPTEMYS NIGRINODA CAGLE. By George W. Folkerts and Robert H. Mount. 1969. Copeia 1969(4):677-682, 6 figs. -- -- While critical comments on subspecific descriptions are seldom seen in the literature there arises the time when such comment seems to be warrented. Messrs. Folkerts and Mount have seen fit to add to the already vast list of subspecific epithets in zoology yet another trinomen. This alone is sufficient reason to raise the hackles of some systematists, but apart from the debate regarding the reality of the subspecies, the legality of the concept has long been upheld (Stoll et al., 1964).

Taxonomy is best served when the application of the subspecies concept is done judiciously. A recent comment on the recognition of the subspecies is worth noting here:"...a subspecies should be described only when to fail to do so would obscure more biological truths than would be lost by describing the subspecies" (Jameson, Mackey, and Richmond, 1966). With this in mind it is worth looking at the criteria that the authors have used in the diagnosis of their subspecies.

Folkerts and Mount distinguished Graptemys nigrinoda delticola from the nominate form on the basis of the following characteristics:"...a complex extensive dark plastral pattern, expanded along borders of plastral sutures, and occupying more than 60% of plastral area; postorbital mark neither crescent-shaped nor strongly recurved laterally, often disconnected from narrow longitudinal light stripes on head; soft parts mostly black; whitish or light yellow longitudinal stripes much narrower than black interspaces; shell relatively higher than in nominate subspecies".

Although superficial, these characters could be indicative of this population's unique adaptation to a particular set of environmental conditions present in its part of the range. Indeed, when a species geographic variation is such to produce a regional tendency that reflects adaptation unique to a particular region it may be worth noting by the use of the trinomen. Unfortunately, Folkerts and Mount have failed to show that delticola has any clear-cut sets of characteristics which are peculiar to the region which it inhabits.

According to the authors, the "intergrades" between nigrinoda and delticola have a plastral pattern covering 30-60% of the plastron while the nominate form has up to 30% of the plastron patterned. The color of the soft parts of the "intergrades" is intermediate between that of nigrinoda and delticola. They also state that the other characteristics are intermediate between the two subspecies. A figure purporting to support their claim that shell height is relatively greater in the newly described form is presented, but all it shows is a north-south cline in relative shell height. No attempt was made by the authors to test the validity of their claim.

Because the populations of Graptemys nigrinoda are sympatric and because of the existance of extensive areas of "intergradation", many times greater than the range of the proposed subspecies, it seems improbable that "well-defined" geographic races have developed. Might not this be a sampling artifact due to inadequate representation from the intermediate areas?

The phenomenon that the authors are dealing with seems to be a typical example of geographic variation which is manifested in the presence of several north to south clines. That the authors have failed to demonstrate any "steps" or breaks in the clines is quite clear. That they have presented no support for the naming of a subspecies is very evident.

A thorough study of geographic variation seems to be in order before the status of the populations of Graptemys nigrinoda is clear lest biological truths be obscured.

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[Received 9 January 1970.]

THE ECONOMICS OF HERPETOLOGICAL PUBLICATION

By Herndon G. Dowling

Until recently, like most herpetologists I had never been greatly involved in the economic aspects of publication. As chairman of the ASIH Herpetological Catalogue Committee, I was strongly and directly involved in 1969, however, when the printer unexpectedly raised the cost of printing the "Catalogue of American Amphibians and Reptiles" from a long-standing $23.50 per page to a steep $60 per page. Again, I was directly involved when the executive committee of the Herpetologists League recently found it necessary to raise the dues of that organization some 60 per cent merely to allow the addition of a half-time editorial assistant.

I mention these examples, not to imply any expertise in the field of publication economics, but to point out the dilemma posed to such organizations by current economic pressures. These pressures are bringing to light the amount of uncalculated (and often unknown and unappreciated) support that is offered these societies by various individuals and institutions.

It had never been brought home to me before the recent AAAS meetings in Boston (26-31 December 1969) that the major publishing costs are incurred prior to the actual printing and distribution of the journal -- and that this, in turn, is only a small part of the overall cost of producing a scientific paper. The Institute of Physics, for example, has calculated that the research for the average research paper costs $60,000, whereas the publication of the paper runs to only about $600. Even if you assume that zoologists come a lot cheaper (say $20,000?), there is still a lot of money tied up in a paper.

The physicists calculate an average production of one page per physicist per year. Whether herpetologists are any more prolific is hard to say. Some are, but I know a lot of herpetologists [some with big grants, too] who produce next to nothing.

Publication costs are somewhat easier to get at, but the greatest portion -- costs of editing, reviewing, etc., are so scattered among various individuals and institutions that donate these services that they are largely ignored. It is only when the chips are down that they have to be taken into consideration.

These hidden costs of editorships are so great that I doubt that most individuals and institutions would so freely assume them if they realized the true extent of the contribution. Few realize that an ordinary article passes through the editor's hands seven times before publication (Fig. 1). Ordinarily each such "pass" means at least one reading,

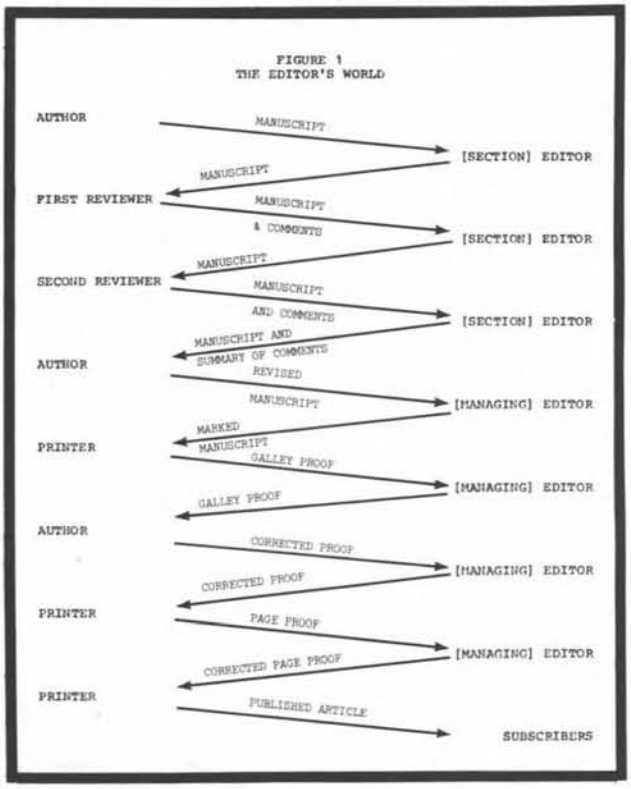


FIGURE 1. A well-written manuscript requires less work than a poor one, but a great deal of handling is involved in either case.

and often considerable correction, revision, and correspondence as well.

The actual costs of a small herpetological journal (falling, say, between Herpetologica and the herpetological part of Copeia) are estimated here (Table I). Listed in this way, the "hidden" costs of editing and reviewing ($12,750) are seen to exceed considerably the usual "publication costs" (composition, engraving, printing dist-ribution) of $8,900 that are commonly assumed by society members.

If the subscribers in the example pay only for the usually-recognized costs of publishing and distribution, then subscription rates will run about $6 ($8,900/1,500 subscribers). The addition

of any of the other real costs will raise this substantially, however ($2 per subscription, just to pay for the editorial assistant), and if subscribers were asked to pay all costs the subscription rates would be about $14.50 ($21,650/1,500). Keep in mind that these are publication expenses only. Any other society activities would require additional support.

An interesting comparison is provided by the American Institute of Physics, that publishes some 87 per cent of all physics papers that appear in the United States -- -- some 80,000 pages per year [20 feet of shelf space]. In this highly-organized and efficient operation (see also Table II), the pre-printing costs are precisely what I calculated for a herpetological journal: $54 per page [does this mean that my estimates are too low?]. The printing and distribution costs are a little higher, ($24 versus $18), but there are thousands more subscribers.

TABLE I
COSTS OF JOURNAL PUBLICATION

EDITORIAL OFFICE		
Editor (half-time, 12-month basis).....	$8,000	
Editorial Assistant & Secretary (half-time)...	3,000	
Postage, telephone, printing, etc.....	500	
		$11,500
REVIEWERS		
Acceptable manuscripts (100 @ $10)...	1,000	
Unacceptable manuscripts (50 @ $5).....	250	
		1,250
PRINTING PREPARATION		
Composition (300 pages @ $10).....	3,000	
Engravings (50 @ $10).....	500	
		3,500
TOTAL PRE-PRINTING COST		$16,250
PRINTING		
Two thousand copies of 300 pages @ $15.....	4,500	
DISTRIBUTION		
Quarterly issues to 1,500 subscribers ($0.15/copy x 4 issues = $0.60 per subscriber x 1,500).	900	
TOTAL OF PRINTING AND DISTRIBUTION		5,400
TOTAL COST OF JOURNAL PUBLICATION..		$21,650
SUMMARY: Pre-printing cost per page.....	$54	
Printing-distribution per page.....	18	
TOTAL COST PER PAGE.....	$72	

The cost of the editor's office was taken from estimates made by one such editor. They correspond closely to estimates made from personal observation.

Reviewer's time is calculated at $10 per hour, with an assumption that review of a manuscript requires one-half hour. Tentatively "acceptable" manuscripts require two reviewers, definitely "unacceptable" manuscripts only one.

Even if distributed among many subscribers, the $78 page cost would make for rather high-priced journals. The Physics Institute does not expect subscribers to pay the full cost, however. Instead, page-charges of $60 are levied on the authors (and their sponsors), who thus pay the entire pre-printing costs; subscribers pay only the much lower printing and distribution costs. Though payment of the page-charges is "optional," the rate of return is kept at near the 90 per cent level (90% of $60 = $54 = actual cost) by the threat of delay in publication.

It is my impression that the costs of inflation (as reflected in the higher costs of materials, personnel, and services), the tighter grant situation, and the more explicit cost-accounting demanded by many agencies, will require the calculation of all these costs soon by all scientific societies -- and probably the payment of them as well. Page-charges are supported by granting agencies, and by some other institutions, and seem to be one promising alternative to rapidly rising subscription rates. However, the small page-charges calculated for Copeia ($20) and Herpetologica ($17) are inadequate, even when the societies depended heavily on the donated work and services of individuals and institutions. The values -- and costs -- of scientific publication have been underrated too long.

TABLE II
APPROXIMATE NUMBER OF CHARACTERS AND SPACES PER PAGE OF TEXT IN DIFFERENT JOURNALS

Herpetologica.....	2,800
Journal of Herpetology.....	4,500
Copeia.....	4,700
Herpetological Review*.....	5,800
PHYSICS JOURNALS.....	6,000
Catalogue of American Amphibians and Reptiles.....	9,600

Differences in content and format must be included in calculating true publication costs.

* Included for comparison only.

UNREVIEWED-UNEDITED COMMUNICATIONS

This section is supported entirely by its authors and their sponsors. Page charges pay the costs of publication, distribution, and 100 author's reprints. Illustrations may be included but must be reduced to proper dimensions (see Advice to Authors, p. 32).

Page charges are: $20 for a single page (134 lines of 42 characters and spaces); $40 for the two-page maximum (272 lines). Include an allowance for the title, and four lines for the author's name and address. [Send check for proper amount with manuscript.]

"Unreviewed-Unedited Communications" is intended for single-subject notes of original observations, preliminary reports, or new ideas on amphibians and reptiles that can be presented in a maximum of two printed pages. Notes on anatomy, behavior, embryology, geographic distribution, physiology, or similar subjects are acceptable. It may be used also for speculations on phylogeny or comments on nomenclature. It is NOT to be used for the description of new taxa.

Because the reviewing and editing processes typical of journal publication are omitted, this section offers a rapid, inexpensive, and relatively-uncensored route of publication. Submission-time to publication-time is two to three months.

These articles will enter the scientific literature on amphibians and reptiles. Authors should list three to six index terms that indicate the limits of subject-material, geography, and included taxa.

The absence of the usual checking mechanisms of the ordinary publication process makes it doubly important that the author write clearly and that he review the manuscript carefully for typographical errors before submitting it. In no other form of publication is the author so clearly responsible for the content and presentation of his work.

The idea of an unreviewed-unedited publication was suggested to me by F. Peter Woodford, of Rockefeller University, in an informal conversation at the recent AAAS meetings in Boston. He presented a paper on this subject in one of the sessions.

The basic concept of unreviewed-unedited publications is that there are many workers who have bits of information or ideas that would be of value to someone who is working on a specific problem. At the same time, the information may seem too trivial or too far from the possessor's main line of research for him to expend the time and effort necessary to expand the item into a major paper. Though some of this information is passed along informally in conversations, personal letters, etc., there is no assurance that it is available to (perhaps) the one person who might need it most. Further, the source of such informal information is easily lost or forgotten, leading to questions of authorship, date of origin, and the availability of original data.

These questions are resolved when there is a recognized publication in a field in which an author may record his ideas and information and thus assure their broad dissemination to fellow workers.

There is no reason for such informational articles to be subjected to the long and costly process of reviewing and editing that is necessary for journal articles. In fact, these procedures interfere with the rapid dissemination that is one of the greatest values of such notes.

A publication that is produced by inexpensive photo-offset methods, that is the organ of a recognized scientific society, and that is NOT a scientific journal in the usual sense, is the ideal outlet for communications of this sort. Herpetological Review admirably fulfills all of these features. And, rather than such publication becoming an additional burden to Society finances, the author (or his sponsor) is asked to pay the costs of publication and distribution. The procedures outlined above allow these costs to be kept to a minimum.

The major objection to such a publication outlet is the fear that it might open the gates of publication too wide -- that certain authors might flood the publication with their ill-conceived ideas, or that uninformed workers might publish redundant material. I think it was James Peters observation, though, that in these times "any boy with a typewriter can start his own herpetological publication." Similarly, it is my observation that any persistent author can get his article published -- if not in Copeia, Herpetologica, or the Journal of Herpetology, at least in the journal of some academy of science or local journal.

Meanwhile, in "making the rounds," the article has cost the various societies uncountable hours of reviewer's and editor's time -- time that could be better spent elsewhere. And if the article does contain some worthwhile information, it has been withheld for months, perhaps for years, from those who might use it. The current system, then, tends more to delay and scatter information, rather than to repress its publication. I believe another approach is needed. Let us give "unreviewed-unedited" a try. -- HGD.

CURRENT HERPETOLOGICAL TITLES, IX: 1969

Herpetological Information Search Systems

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This is the ninth list that contains titles of books and articles relating to the field of herpetology that were published since the initiation of our bibliographic project. The name of the project has been changed to more clearly indicate its present emphasis. The 706 titles listed here bring the total for 1969 to 2,300. The 1968 titles are continuing to come in! It may be that the final total for that year will approach 4,000.

Though we will continue to enter titles published in earlier years to our system, on the basis that two-year-old literature is no longer current, we will not publish these titles in forthcoming lists.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of some interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

Our present policy, then, is to list the title of any paper that is concerned with a member of a Recent order of amphibians or reptiles.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive. We have published 8,325 "Current Titles" since January 1968.

This ninth list contains titles of books and articles that have come to our attention during the period 17 October 1969 through 6 January 1970.

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and T. Shaman. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need, however, and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 17 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

*H*ERPETOLOGICAL
*I*NFORMATION
*S*EARCH
*S*YSTEMS



OFFERS:

"CURRENT TITLES" for 1970 on Library Cards, about one-third of them with abstracts. Also available for 1968 & 1969 (Library of Congress stock, hole-punched, alphabetical).

BIBLIOGRAPHIES of individual authors.

SPECIAL BIBLIOGRAPHIES on amphibians and reptiles, restricted by subject and/or taxon and/or geography.

COPIES of original descriptions or other important literature.

DRAWINGS of important taxonomic features (see above).

CONSULTATION on projects involving amphibians and reptiles, their literature, morphology, economics....

FOR INFORMATION ON AVAILABILITY AND COST, WRITE:
H. G. Dowling, HISS Director
American Museum of Natural History
New York, N. Y. 10024

- A -

ABDEL-WAHAB,MOHAMED F.
1969 Labeling and fractionation of black mamba venom using iodine-131 and gel-filtration technique
ISOTOPENPRAXIS 5(4):149-151. (Engl) (from Chem. Abstr. 71:77)

ABE,KAORU, G.ALAN ROBISON, GRANT W.LIDDLE, REGINALD W.BUTCHER, WENDELL E.NICHOLSON and CHRISTINE E.BAIRD
1969 Role of cyclic AMP in mediating the effects of MSH, norepinephrine, and melatonin on frog skin color
ENDOCRINOLOGY 85(4):674-682, 10 fig., 2 tab.

ABELES,A.L.
1969 Structure-activity relationships of several cardiotonic steroids with respect to inhibition of ion transport in frog muscle
J GEN PHYSIOL 54(2):268-284, 10 fig., 6 tab.

ADAMYAN,S.YA.
1969 The effect of ADH, K- and CA-ions and stimulation on the non-electrolyte permeability of okeletal ƒsic] muscles of the frog
TSITOLOGIYA 11(2):154-162, 3 fig., 2 tab. (Russ, Engl summ)

ALBERTI,K.G.M.M. and GEOFFREY W.G.SHARP
1969 Macromolecular binding of aldosterone in the toad bladder
BIOCHIM BIOPHYS ACTA 192(2):335-346, 6 fig., 4 tab. (Engl)

ALEXANDER,NANCY J.
1969 Formation of alpha and beta keratin in reptiles
J CELL BIOL 43(2)part 2:3a.

ALEXANDER,NANCY J. and PAUL F.PARAKKAL
1969 Formation of alpha- and beta-type keratin in lizard epidermis during the molting cycle
Z ZELLFORSCH 101(1):72-87, 12 fig. (Engl)

ALLEN,ANDREW
1969 The edible frog
AQUARIST AND PONDKEEPER 34(7):204-205, photo.

AMARO,A.
1969 Sinopse dos Opalinideos Brasileiros (Sarcomastigophora, Opalinata). III. Nota (I parte): genero: "Zelleriella" Metcalf, 1920
ATAS SOC BIOL RIO DE JANEIRO 12(5-6):237-243, illus. (Span)

AMARO,A.
1969 Sinopse dos Opalinideos Brasileiros (Sarcomastigophora, Opalinata. III. Nota (II parte): genero "Zelleriella" Metcalf, 1920
ATAS SOC BIOL RIO DE JANEIRO 12(5-6):307-314, illus. (Span)

AMER,F.I.
1969 Experimental studies on the origin of the germ cells in Bufo regularis Reuss
ZOOL ANZ 182(3-4):208-212, 4 fig. (Engl)

ANDERSON,JAMES D.
1969 Preface to the Dover Edition, p. v-xi, In, Mary C. Dickerson, The frog book: North American Toads and frogs, with a study of the habits and life histories of those of the northeastern states. Dover Publ., Inc., New York.

ANDERSON,STEVEN C. and ALAN E.LEVITON
1969 Amphibians and reptiles collected by the Street Expedition to Afghanistan, 1965
PROC CALIF ACAD SCI 37(2):25-56, 8 fig., 1 tab.

ANDREW,WARREN
1969 Comparative study of aging of the liver
ACTA ANAT NIPPON 44(2):70-71. (Engl)

ANDREW,WARREN
1969 The nature of pigment cells in the liver of Ambystoma mexicanum, and their changes with age
J CELL BIOL 43(2)part 2:7a.

ANON
1969 Adapting to extra legs
SCI NEWS 95(23):551.

ANON
1969 Asklepios and the rod-and-serpent emblem
MED J AUST 1969:237-238.

ANON
1969 Basic care
INT TURTLE TORTOISE SOC J 3(5):4-7, 35, photos.

ANON
1969 The collections, as of 30 June 1968
ANNU REP SMITHSONIAN INST NAT ZOOL PARK 1968:XXX-XLI.

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1969 A cloudburst for crocodiles
MEMO N Y Z S December 1969.

ANON
1969 Conservation - general
S AUST NATUR 44(1):9.

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1969 Care of hatchlings
INT TURTLE TORTOISE SOC J 3(4):29, 38.

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1969 Care of turtle and tortoise hatchlings
TORTUGA GAZETTE 5(8):4.

ANON
1969 Division of amphibians and reptiles
K U MUS NATUR HIST ANNU 1968:24-25.

ANON
1969 Duladgin Rock - Reserve nos. 2179 and 3112
FAUNA BULL (WEST AUST) 3(3):4-6.

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1969 Frog embryo growth unaffected by weightlessness
NASA FACTS NF3-10-68:4, photo.

ANON
1969 Fungus infection, African soft-shelled turtle Trionyx triunguis
ANNU REP SMITHSONIAN INST NAT ZOOL PARK 1968:XVIII.

ANON
1969 Fewer tortoises in Britain
NATURE (LONDON) 223(5213):1302-1303.

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1969 Geochelone elephantopus -- Galapagos tortoises
TORTUGA GAZETTE 5(10):7-8.

ANON
1969 Guyana protects turtles
KINGFISHER 4(5):14.

ANON
1969 The green sea turtle -- Chelonia mydas
TORTUGA GAZETTE 5(3):5.

ANON
1969 Herpetology
ANNU REP CALIF ACAD SCI 1968-1969:19-21, illus.

ANON
1969 How do lizards defy gravity? They hang on
N Y TIMES Sept. 9, 1969:49.

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1969 Information wanted
KINGFISHER 4(5):18.

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1969 Fuer junge Terrarianer: Der Feuersalamander
KOSMOS 65(9):395, 1 fig. (color). (Ger)

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1969 List of the animals exhibited in the gardens during the year ended 30th June, 1969
ANNU REP ROY ZOOL SOC S AUST 1968-69:18-23.

ANON
1969 Leapin' lizards! It's a green crested basilisk
LIFE 67(24):88-90, photos. (col.)

ANON
1969 Morelet's crocodile near extinction
ORYX 10(2):88.

ANON
1969 Monitoring things that crawl and fly
SCI RES (N Y) 4(22):30-31, illus.

ANON
1969 The notorious bushmaster
IN ANIMALAND (STATEN ISLAND) 36(3):no pagination.

ANON
1969 Nature's copy cats, no disgrace in duplication by nature
ANIMALAND 36(4):no pagination, photo.

ANON
1969 Notes and statistics from the May annual show
TORTUGA GAZETTE 5(7):5-9.

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1969 Photo of Acinixys planicauda
INT TURTLE TORTOISE SOC J 3(4):41.

ANON
1969 Photo contest '69
INT TURTLE TORTOISE SOC J 3(5):26-29, photos.

ANON
1969 Protection for Papua's crocodiles
ORYX 10(2):81.

ANON
1969 4062B Peachtree Road
CONSERV NEWS 34(20):3.

ANON
1969 Photo of the rare "Golden Frog"
SCI MARCH 49(3):35.

ANON
1969 Pseudemys scripta elegans, red ear or elegant slider
TORTUGA GAZETTE 5(5):3-4.

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1969 Rx health hints
INT TURTLE TORTOISE SOC J 3(5):31.

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1969 Snakes alive!
FAUNA BULL (WEST AUST) 3(3):18.

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1969 Steatitis in the American alligator A. mississipiensis
ANNU REP SMITHSONIAN INST NAT ZOOL PARK 1968:XVIII-XIX.

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1969 Systematic biology.
Publ. Nat. Acad. Sci. (#1692), 632 p.

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1969 Stock bred during the year
ANNU REP ROY ZOOL SOC S AUST 1968-69:24.

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1969 Special movie award "Alligator!!"
FLA WILDLIFE 23(6):34, photo.

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1969 "Solomon, the sea turtle"
INT TURTLE TORTOISE SOC J 3(4):6-9, 30, illus.

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1969 Sea turtle named Koko
VA(NCOUVER) AQUAR NEWSLETT 13(4):no pagination.

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INT TURTLE TORTOISE SOC J 3(5):37-38. (Reprinted from booklet publ. by London Zool. Soc. 1965)

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1969 The turtle fishery of Western Australia
FAUNA BULL (WEST AUST) 3(3):40-43, illus.

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1969 Toad sticker
ELAST NOTEB (150):168, photo.

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1969 Tortoises of the world
INT TURTLE TORTOISE SOC J 3(5):inside back cover.

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1969 Verslagen van de Maandvergaderingen
NATUURHIST MAANDBLAD 58(9):141-145, illus. (Dutch)

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1969 World-famous London Zoo
INT TURTLE TORTOISE SOC J 3(4):39, illus.

ANON
1969 Wildlife photography contest-1969
WILDLIFE N C 33(11):16-17, photos.

ARMSTRONG,W.MCD., DOREEN LURIE, M.R.BURT and J.R.HIGH
1969 Extracellular volume and ionic content of frog ventricle
AMER J PHYSIOL 217(4):1230-1235, 2 fig., 3 tab.

ARNOLD,W.
1969 Subcommissural organ and Reissner's fibre of the tortoise under conditions of osmotic stress
Z ZELLFORSCH 101(1):152-166, 8 fig. (Ger, Engl summ)

ARSECULERATINE,S.N., L.M.DE SILVA, C.H.S.R.BANDUNATHA, G.E.TENNEKOON, S.WIJESUNDERA and K.BALASUBRAMANIAM
1969 The use of tadpoles of Bufo melanostictus (Schneider), Rhacophorus leucomystax maculatus (Gray) and Uperodon sp. in the bioassay of aflatoxins
BRIT J EXP PATHOL 50(3):285-294, 10 fig., 4 tab.

ATKIN,ERIC et al
1969 Operation pond probe
NATURE SCI 7(3):7-10.

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BADEN,HOWARD P., SYLVESTER SVIOKLA and PAUL F.A.MADERSON
1969 A comparative study of histidase activity in amphibian, avian, reptilian and mammalian epidermis
COMP BIOCHEM PHYSIOL 30(5):889-894, 4 tab.

BAGCHI,MIHIR and HOWARD ROTHSTEIN
1969 Effect of cycloheximide on the healing of lenticular injuries
J CELL BIOL 43(2)part 2:9a.

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1969 Initial experiments with migrating Chelonia mydas using telemetry
PRELIM TECH REP Sensory Systems Lab., P.O.B. 5145, Tucson, Ariz. 33 p. (mimeo)

BALDWIN,MERLE
1969 Crocodiles and mangroves
WILDLIFE AUST 6(3):90.

BALDWIN,WILLIAM M.,III and NICHOLAS COHEN
1969 Liver induced immunosuppression of transplantation immunity in the newt
AMER ZOOL 9(4):1131-1132.

BANARESCU,PETRU
1969 Animale noi si rare in fauna Romaniei
NATURA (BUCURESTI) 21(4):43-53, 9 fig. (Roum)

BANERJEE,V. and M.BANERJEE
1969 Seasonal variations of erythrocyte number and haemoglobin content in a common Indian lizard Varanus monitor (Linnaeus)
ZOOL ANZ 182(3-4):203-207, 1 fig., 1 tab. (Engl)

BANNIKOV,A.G. and I.S.DAREVSKII
1969 A new subspecies Lygodactylus angularis (Sauria, Gekkonidae) from eastern equatorial Africa
ZOOL ZH (3):452-454, illus. (Russ)

BARBOUR,ROGER W.
1969 The black racer
KY HAPPY HUNTING GROUND 25(6):33, photo, map.

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1969 Home range, movements, and activity of the eastern worm snake, Carphophis amoenus amoenus
ECOLOGY 50(3):470-476, 6 fig., 2 tab.

BARBOUR,ROGER W.
1969 The mud snake
KY HAPPY HUNTING GROUND 25(5):33, illus.

BAUER,FRITZ
1969 Ueber das Auftreten von Entzuendungen der Mundschleimhaut bei Reptilien
AQUAR TERR 16(8):276-277. (Ger)

BAUMANN,CH.
1969 Regeneration of rhodopsin in the isolated retina of the frog (Rana esculenta)
PFLUEGERS ARCH EUROPE J PHYSIOL 312(1-2):R132. (Ger)

BECHTLE,WOLFGANG
1969 Hauptsache: der Bauch ist voll
AQUAR MAG 3(10):425, photo. (Ger)

BECHTLE,WOLFGANG
1969 Jeder war mal Terrarianer
AQUAR MAG 3(10):394-395, photo. (Ger)

BECHTLE,WOLFGANG
1969 Lieben Sie Rubens?
AQUAR MAG 3(10):428, photo (col.). (Ger)

BECHTLE,W.
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AQUAR MAG 3(10):409, photos. (col.). (Ger)

BEDDALL,BARBARA G. (Ed)
1969 Wallace and Bates in the tropics. Macmillan Co., London. ix + 241 p.

BELTZ,RONALD
1969 Mostly tortoises
TORTUGA GAZETTE 5(1):3.

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1969 Mostly tortoises
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TORTUGA GAZETTE 5(3):3.

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TORTUGA GAZETTE 5(4):3-4.

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1969 Mostly tortoises
TORTUGA GAZETTE 5(6):3-4.

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1969 Mostly tortoises
TORTUGA GAZETTE 5(7):3.

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1969 Mostly tortoises
TORTUGA GAZETTE 5(8):3.

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1969 Let's talk tortoise
INT TURTLE TORTOISE SOC J 3(4):4-5, illus.

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1969 Behavioral evidence for color discrimination by the whiptail lizard, Cnemidophorus tigris
COPEIA 1969(4):707-722, 6 fig., 3 tab.

BENSON,BRADLEY J. and MAC E.HADLEY
1969 In vitro characterization of adrenergic receptors controlling skin gland secretion in two anurans Rana pipiens and Xenopus laevis
COMP BIOCHEM PHYSIOL 30(5):857-864, 2 fig., 5 tab.

BERCU,B.B. and H.J.BRINKLEY
1969 Hypothalamic and cerebral cortical inhibitors of a melanocyte-stimulating substance secreted by the pars distalis of the frog pituitary gland
EXPERIENTIA (BASEL) 25(8):879-880, 2 tab. (Engl)

BERGMAN,CLAUDE and JACQUELINE BERGMAN
1969 Analyse quantitative des permeabilites ioniques stationnaires des fibres sensorielles et motrices de grenouille
C R SEANC SOC BIOL 163(3):606-611, 4 fig. (Fr)

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1969 Systematics of forms within Rana esculenta complex
PRZEGL ZOOL 13(3):219-238, 14 fig., 3 tab. (Pol)

BERNS,MICHAEL W. and DONALD E.ROUNDS
1969 Laser microirradiation of chromosomes, nucleoli, and mitochondria of mammalian and amphibian cells in tissue culture
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1969 Developpement apres la metamorphose de competences immunologiques envers les homogreffes cutanees chez Xenopus laevis Daudin
C R ACAD SCI (PARIS) D 269(11):1011-1014, 2 fig., 1 tab. (Fr)

BERTRAM,COLIN and MARK BERTRAM
1969 Pigeon towers of Isfahan
GEOGR MAG 41(7):516-521, illus. (some col.).

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1969 DNA content of mauthner cell nuclei in Xenopus laevis: a spectrophotometric study
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BIRNSTIEL,M., M.GRUNSTEIN, J.SPEIRS and W.HENNIG
1969 Family of ribosomal genes of Xenopus laevis
NATURE (LONDON) 223(5212):1265-1267, 4 fig.

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1969 Lacerten-bastarde Lacerta strigata x Lacerta a. agilis und Lacerta strigata x Lacerta viridis meridionalis
AQUAR TERR 16(8):262-265, 3 fig. (Ger)

BLACKMORE,E.H.
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BLATT,LOIS M., KI-HAN KIM and PHILIP P.COHEN
1969 The effect of thyroxine on ribonucleic acid synthesis by premetamorphic tadpole liver cell suspensions
J BIOL CHEM 244(18):4801-4807, 6 fig., 3 tab.

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1969 Lissamphibian origins: possible protolissamphibian from the lower permian of Oklahoma
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LIFE SCI 8(1):881-888, 2 tab.

BOQUET,P., J.DETRAIT and R.FARZANPAY
1969 Recherches biochimiques et immunologiques sur le venin des serpents. III.-Etude des analogues de l'antigene alpha du venin de Naja nigricollis
ANN INST PASTEUR (PARIS) 116:522-542, 4 tab., 4 pl. (Fr, Engl summ)

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1969 Characteristics of ATPase system of turtle bladder epithelium
AMER J PHYSIOL 217(5):1496-1503, 9 fig., 7 tab.

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1969 Recherches ecologiques et biologiques sur le Chamaeleo pardalis Cuvier 1829 de l'ile de la reunion et de Madagascar. Doctoral Thesis submitted to Univ. of Montpellier. xiii + 211 p., 44 fig., 15 tab. (mimeo). (Fr)

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1969 Respiratory-heart rate responses in reptiles
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1969 Effect of valinomycin on isolated urinary bladder of Pseudemys scripta. I. Effect on electrical parameters under aerobic conditions
BIOCHIM BIOPHYS ACTA 193(2):361-367, 3 fig., 2 tab. (Engl)

WYSSBROD,HERMAN R.
1969 Slow cis-stimulation of sodium transport across isolated urinary bladders of the fresh-water turtle, Pseudemys scripta
BIOCHIM BIOPHYS ACTA 183(3):577-590, 2 fig., 3 tab.

- Y -

YAMAMOTO,TORAO, TATSUO EBE and SHIGERU KOBAYASHI
1969 Intramitochondrial inclusions in various cells of a snake (Elaphae quadrivirgata) /sic/
Z ZELLFORSCH 99(2):252-262, 16 fig. (Engl)

- Z -

ZACCANTI,FRANCESCO and FOSCARINA DI GRANDE
1969 Effetti del testosterone sulle gonadi e sugli organi di bidder in esemplari postmetamorfici di Bufo bufo
ATTI ACCAD NAZ LINCEI REND CL SCI FIS MAT NATUR 46(1): 106-110, 1 tab., 1 pl. (Ital, Engl summ)

ZAMACHOWSKI,WLADYSLAW
1969 Changes in the water content in the organism of the common frog (Rana temporaria L.) and the water frog (Rana esculenta L.) in the annual cycle
ACTA BIOL CRACOV SER ZOOL 11(2):213-225, 4 fig., 2 tab. (Engl)

ZIMMERLI,E.
1969 Aus dem Reichtum der Natur
VOEGEL HEIMAT 39(12):242, illus. (Ger)

ZUG,GEORGE R.
1969 Reptilian locomotion
MD HERPETOL SOC NEWSLETT 5(2A):2.

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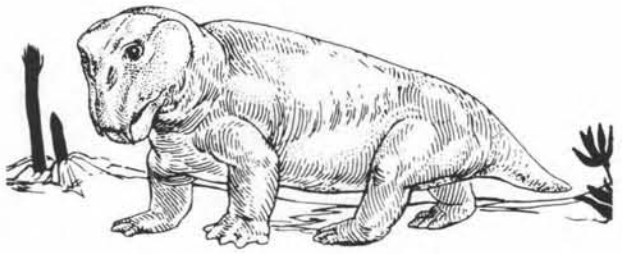
JOURNALS INCLUDED

Listed below are the 236 different journals (several issues of some) in which articles relating to amphibians and reptiles were found during this quarter. This list is intended, not only as a check-list of journals covered, but also as an indicator of the highly scattered nature of articles pertaining to these animals.

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ACTA ANAT 72(4)
ACTA ANAT NIPPON 44(2)
ACTA BIOCHIM BIOPHYS ACAD SCI HUNG 4(1)
ACTA BIOL CRACOV SER ZOOL 11(2)
ACTA PARASITOL POL 16(6)
ACTA ZOOL FENN (122)
ACTA ZOOL (STOCKHOLM) 50(1-2)
AFRICANA 9(3)
AMER J ANAT 125(4)
AMER J PHYSIOL 217(4) (5)
AMER MIDLAND NATUR 81(2), 82(1)
AMER MUS NOVITATES (2395) (2396)
AMER NATUR 103(931) (933)
AMER ZOOL 9(4)
ANAT REC 165(2) (3)
ANIM KINGDOM 72(3) (4)
ANIMALAND 36(4)
ANN INST PASTEUR (PARIS) 116
ANN SPELEOL 24(2)
ANN TROP MED PARASITOL 63(1)
ANNEE BIOL 8(7-8)
ANNU CONF SOUTHEAST ASS GAME FISH COMM 23rd
ANNU REP CALIF ACAD SCI 1968-69
ANNU REP PORT ELIZABETH MUS 1968
ANNU REP ROY ZOOL SOC S AUST 1968-69
ANNU REP SMITHSONIAN INST NAT ZOOL PARK 1968
ANNU REV GENET 3
ANNU REV PHYSIOL 31
AQUA TERRA 6(10)
AQUAR 40(3)
AQUAR MAG 3(10), 1969(2)
AQUAR TERR 16(8) (9)
AQUARIA 16(7)
AQUARIEN TERRARIEN Z 22(10) (11)
AQUARIST AND PONDKEEPER 34(6) (7)
ARCH BIOL SCI (TT66-59008/3-4)
ARCH INT PHARMACODYN THER 177(2)
ARCH INT PHYSIOL BIOCHIM 77(2)
ARNOLDIA 4(25)
ATAS SOC BIOL RIO DE JANEIRO 12(5-6)
ATTI ACCAD NAZ LINCEI REND CL SCI FIS MAT NATUR 45(5), 46(1)
AUDUBON MAG 71(5)
AUST J EXP BIOL MED SCI 47(3) (4)
AUST ZOOL 15(2)

BETES NATURE (63) (67) (69)
BIOCHEM J 114(2)
BIOCHEM PHARMACOL 18(8)
BIOCHEMISTRY 8(10)
BIOCHIM BIOPHYS ACTA 192(2), 193(1) (2) (3)
BIOL J LINN SOC 1(1-2)
BIOL REPROD 1(3)
BIOL RUNDSCH 7(4)
BIOL ZENTRALBL 88(4)
BIOPHYS J 9(10)
BIOSCIENCE 19(7) (9) (10)
BLIJDORP GELUIDEN 17(9) (10)
BOKMAKIERIE 21(3)
BOL SOC BIOL CONCEPCION 41
BOLL SOC ITAL BIOL SPER 45(1) (2)
BRAIN RES 15(2)
BREVIORA (327) (331)
BRIT J EXP PATHOL 50(3)
BRIT J HAEMATOL 16(6)
BULL ACAD POL SCI SER SCI BIOL 17(5)
BULL ACAD SCI GEORGIAN SSR 54(3)
BULL INST FOND AFR NOIRE (A) 31(2)
BULL JAP SOC SCI FISH 35(5)
BULL MD HERPETOL SOC 5(3)
BULL N J ACAD SCI 14(1-2), SPEC SYMP ISSUE
BULL S CALIF ACAD SCI 68(3)
BULL ZOOL NOMENCL 26(2)
C R ACAD SCI (PARIS) D 269(3) (4) (5) (6) (11)
C R SEANC SOC BIOL 162(5-6), 163(3)
CALDASIA 10(48)
CALIF FISH GAME 55(4)
CAN J ZOOL 47(5)
CAROLINA TIPS 32(11)
CARYOLOGIA 22(1)
CIENC INVEST (BUENOS AIRES) 25(3)
COMP BIOCHEM PHYSIOL 30(2) (5)
CONSERV NEWS 34(20)
COPEIA 1969(3) (4)
CRYOBIOLOGY 6(2)
CURR MOD BIOL 2
DEVELOP BIOL 20(4) (5)
DISS ABSTR B 29(12)
DOKL AKAD NAUK SSSR 185(1) (4), 187(1-3) (4-6)
ECOL MONOGR 39(3)
ECOLOGY 50(3)
ELAST NOTEB (150)
ENDEAVOUR 28(105)
ENDOCRINOLOGY 85(4)
ENVIRON SOUTHWEST (416)
ERGEB ANAT ENTWINCKL 41(6)
EXP NEUROL 25(2)
EXPERIENTIA (BASEL) 25(8)
FAUNA BULL (WEST AUST) 3(3)
FIELD 234(6085)
FIZIOL ZH SSSR IM I M SECHENOVA 55(8)
FLA WILDLIFE 23(5) (6)
FOLIA ENTOMOL HUNG 21(suppl)
FORMA FUNCTIO (2)
GEN COMP ENDOCRINOL 12(1), 13(2)
GEOGR MAG 41(7)
GEOTIMES 14(9)
GSA SPEC PAP (105)
HERP 6(1)
HERPETOL REV (8)
HERPETON 4(1)
HOPPE-SEYLER'S Z PHYSIOL CHEM 350
IN ANIMALAND (STATEN ISLAND) 36(3)
INDIAN J MED RES 57(2)
INT TURTLE TORTOISE SOC J 3(4) (5)
INT ZOO YEARB 9
ISOTOPENPRAXIS 5(4)
J AMER CHEM SOC 91(14)
J AMER VET MED ASS 155(7)
J ANAT 105(2)
J BIOL CHEM 244(18)
J CELL BIOL 42(2), 43(2)
J COMP NEUROL 137(2)
J COMP PHYSIOL PSYCHOL 67(4)
J EXP ZOOL 171(2) (3) (4)
J GEN PHYSIOL 54(2) (4)
J MAMMALOGY 50(3)
J MEMBRANE BIOL 1(1)
J MORPHOL 127(2), 129(2) (3)
J PARASITOL 55(5)
J PHYSIOL (CAMBRIDGE) 202(1)
J ULTRASTRUCT RES 29(1-2)
J ZOOL (LONDON) 159
K U MUS NATUR HIST ANNU 1968
KINGBIRD 19(3)
KINGFISHER 4(5)
KOEDOE (12)
KOSMOS 65(9)
KY HAPPY HUNTING GROUND 25(6)
LA CONSERV 21(9-10)
LANCS CHES FAUNA SOC PUBL (55)
LIBERIAN NATUR 5(1)
LIFE 67(24)
LIFE SCI 8(1)
LOON 41(3)
MD HERPETOL SOC NEWSLETT 5(2A)
MED J AUST 1969
MEM MUS NAT HIST NATUR PARIS SER A ZOOL 58(1)
MIDWEST REP ANIM SALES PRICE LIST
N Y TIMES Sept. 9,1969, Nov. 21,1969, Nov. 22,1969
NASA FACTS NF3-10-68
NASA TECH TRANSL (F12-153) (F12-419)
NATUR UND MUSEUM 99(8)
NATURA (BUCURESTI) 21(4)
NATURE (LONDON) 223(5212) (5213), 224(5214)
NATURE SCI 7(1) (3)
NATURWISS MED 6(28)
NATUURHIST MAANDBLAD 58(9)
NAUNYN-SCHMIEDEBERGS ARCH PHARMAKOL EXP PATHOL 263, 264(3)
NETH J ZOOL 19(2)
NIGERIAN FIELD 34(1)
NOTULAE NATUR (PHILADELPHIA) (424)
OHIO J SCI 69(5)
ORYX 10(2)
PFLUEGERS ARCH EUROPE J PHYSIOL 310(2), 312(1-2)
PHYSIOL ZOOL 42(4)
PRAEPARATOR 15(3-4)
PRIRODA (MOSKVA) (4) (10)
PROC CALIF ACAD SCI 37(2)
PROC INDIAN ACAD SCI SECT B 69(4), 70(1)
PROC JAP ACAD 45(5)
PROC ROY SOC QUEENSLAND 80(5)
PROC SOC EXP BIOL MED 131(4)
PRZEGL ZOOL 13(2) (3)
PSYCHOL REP 25(1)
PUKU OCCAS PAP DEP GAME FISH ZAMBIA 1969(5)
QUART J FLA ACAD SCI 31(4)
QUART REV BIOPHYS 2(3)
RAPP COMM INT MER MEDIT 19(5)
REC QUEEN VICTORIA MUS LAUNCESTON (34)
REP NAT MUS RHODESIA 1968
RESP PHYSIOL 7(3)
REV BRASIL BIOL 29(3)
REV FED FRANC SOC SCI NATUR 3 SER 8(34)
REV SUISSE ZOOL 76(19)
RIV PARASSITOL 30(2)
ROTUNDA 2(4)
S AUST NATUR 44(1)
SALAMANDRA 5(1-2)
SB RAB INST TSITOL AKAD NAUK SSSR (13)
SCI AMER 221(1)
SCI MARCH 49(3)
SCI NEWS 95(23)
SCI PROGR NATUR (PARIS) 1969(3406)
SCI REP YOKOHAMA NAT UNIV (15)
SCI RES (N Y) 4(22)
SCIENCE (WASHINGTON) 165(3888) (3894) (3897) (3900), 166(3903) (3906) (3907) (3913)
SCIENCES (N Y ACAD SCI) 9(8) (10)
SENCKENBERGIANA BIOL 50(1-2)
SILLIMAN J 16(2)
SNAKE 1(1)
SOUTHWEST NATUR 14(2)
TEX J SCI 21(1)
TEX PARKS WILDLIFE 27(6) (7) (9)
TEX REP BIOL MED 27(2)
TORTUGA GAZETTE 5(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)
TOXICON 7(2)
TRANS KY ACAD SCI 30(1-2)
TRANSPLANTATION 7(5)
TSITOLOGIYA 11(2) (8)
TURTOX NEWS 47(7)
UITGAVEN NATUURWETENSCH STUD SURINAME NED ANTILLEN 29(54)
UNIV KANS PUBL MUS NATUR HIST 18(4) (6)
UNIV KANS SCI BULL 48(15) (19)
VA(NCOUVER) AQUAR NEWSLETT 13(4)
VESTN CESK SPOLECHOSTI ZOOL 33(3)
VESTN MOSK UNIV SER VI BIOL POCHOVED (3) (4)
VICTORIAN NATUR 86(8) (9) (10)
VICTORIA'S RESOUR 11(3)
VISION RES 9(8)
VOEGEL HEIMAT 39(12)
WALKABOUT 35(10)
WILDLIFE AUST 6(3)
WILDLIFE N C 33(9) (10) (11)
WILHELM ROUX ARCH ENTWICKLUNGSMECH ORGANISMEN 163(3)
YOUR DETROIT ZOO 23(2)
Z ANAT ENTWICKLUNGSGESCH 129(1)
Z MIKROSK-ANAT FORSCH 80(2) (4)
Z TROPENMED PARASITOL 20(3)
Z ZELLFORSCH 98(2) (4), 99(2), 100(2), 101(1)
ZENTRALBL GEOL PALAEONTOL 4(2)
ZH EVOL BIOKHIM FIZIOL 5(3)
ZH OBSHCH BIOL 30(5)
ZOO (ANTWERPEN) 35(1)
ZOOL ANZ 182(3-4)
ZOOL J LINN SOC 48(3)
ZOOL MAG 78(6)
ZOOL MEDED RIJKSMUS NATUUR HIST LEIDEN 43(19)
ZOOL ZH 1969(3)
ZOONOOZ 42(9)



LYSTROSAURUS AND CONTINENTAL DRIFT

Ordinarily, few things herpetological would be of less interest to the student of Recent reptiles than the range extension of a Lower Triassic dicynodontian therapsid (Reptilia: Synapsida). But when the record is from Antarctica and the reptile is Lystrosaurus, an index-fossil of the South African Upper Beaufort beds, it is of interest to all.

The previously-described diverse Permian flora of Antarctica and the small piece of bone identified by E. H. Colbert as part of a jaw of a labyrinthodont amphibian (1968, Science 161(3840):460) were interesting in themselves, but hardly pertinent to the herpetogeography of Recent orders. However, Colbert's recent identification of Lystrosaurus among the remains of other reptiles and amphibians that his field party found at Coalsack Bluff in the Alexandra Range of Antarctica (N.Y. Times, 6 December 1969) points to a direct connection between South Africa, India, and this southern continent in the Lower Triassic. The as-yet-unstudied other animals may point to additional land connections.

Whether or not one accepts the entire theory of continental drift, this indication of southern intercontinental connection does provide some reasonable alternative to the tenuous "northern route" explanation of the presence of the ascaphid frog genus Liopelma and a rhynchocephalian reptile (Sphenodon) in New Zealand. Palacrodon (Rhynchocephalia: Sphenodontidae) inhabited South Africa during the Lower Triassic. And if Antarctica's connections with other continents persisted into the Jurassic, this could have affected the distributions of many other Recent orders. Frogs were well-established by the Middle Jurassic. Turtles are known from the Middle Triassic and the living genus Trionyx is recognized in the Upper Jurassic. Lizards (Upper Triassic) and eosuchian crocodiles (Upper Jurassic), likewise, were present.

The resemblance of Australia and South America in their faunas of chelid turtles and leptodactylid and hylid frogs again gains prominance. And how about the pipid frogs of Africa and South America? Could they have arrived via an Antarctic connection? And could such a connection have played some part in the faunal resemblance of Madagascar to South America (boas, iguanid lizards, and the side-necked turtle Podocnemis)?

It is too much to expect that the vision of a warm and continent-connected Antarctica will solve all of the problems of Recent reptile and amphibian geography. However, all students of these animal groups can feel especially grateful to Dr. Colbert for providing them with this new vantage-point now. This rigorous and far-fetched expedition (its basis a single scrap of bone) was taken in the year of his retirement from the American Museum. -- HGD. [Photo courtesy of AMNH. Drawing reprinted from THE AGE OF REPTILES by Edwin H. Colbert. By Permission of W. W. Norton & Company, Inc. Copyright © by Edwin H. Colbert.]



Dr. Colbert in his Antarctic laboratory.

GERMAN HERPETOLOGICAL SOCIETY

By Harry W. Greene
Eysseneckstrasse 12, Frankfurt am Main
West Germany

Established in 1965, the DEUTSCHE GESELLSCHAFT FÜR HERPETOLOGIE UND TERRARIENKUNDE is devoted to the study of all aspects of the biology of reptiles and amphibians. To this end the society arranges an annual convention, monthly meetings for local groups, provides a library service for European members, and publishes the journal Salamandra.

The journal is international in scope and should be of particular interest to American herpetologists. Printed on good quality glossy paper, Salamandra has an attractive format and excellent photographic reproduction. For the benefit of those who do not read German, each major paper is accompanied by an English summary and all figures have legends in both languages. The most recent issue (Vol. 5(1-2):1-80) contains articles on: an evaluation of the effectiveness of 13 insecticides in treating mite and tick infestations of captive reptiles and amphibians; techniques and results of amputation of the tail of Tiliqua scincoides; natural hybridization between Bufo calamita and B. viridis; courtship and mating behavior of Eryx johni; a new subspecies of Tupinambis teguixin from Isla dos Buzios, Brazil; observations on habitat selection by Testudo geometrica in South Africa; the rudimentary voice of B. bufo; distribution of Vipera aspis in Spain; a discussion of the herpetofauna of Tobago; and a note reporting a longevity record for Salamandra salamandra [43 years!]. In addition to these formal contributions, there are 53 short "Besprechungen" (abstracts) of recent herpetological papers and five reviews of new books.

Membership in the society is open to all interested individuals, groups, and institutions. Dues (including subscription to Salamandra) are DM 20 (about $5.50) a year plus an application fee of DM 2 ($.55). Back issues of the journal are available at reasonable rates. Send applications for membership (accompanied by international money order) and requests for additional information to the society president, Dr. Konrad Klemmer, at the Senckenberg Museum, Senckenberg-Anlage 25, 6000 Frankfurt am Main 1, West Germany.



MEETINGS AND SOCIETIES

CALENDAR 1970

25-28 March....SOCIETY FOR THE STUDY OF EVOLUTION, Silver Anniversary Meeting, Austin, Texas.

26-31 March....AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, Annual Meeting, New Orleans.

23-29 August....AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Annual Meeting, Bloomington, Indiana.

27-30 August....SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, Annual Meeting, Kansas City, Missouri.

26-31 December....AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Chicago.

28-30 December....HERPETOLOGISTS LEAGUE, Annual Meeting (with AAAS).

The FIRST CENTRAL ASIAN CONFERENCE ON VENOMOUS ANIMALS AND THEIR VENOM met in Tashkent, Uzbek, S.S.R., 1-3 October 1968, under the auspices of the Uzbek Academy of Sciences. Some 157 persons representing 27 institutions in various cities and states of the USSR and its dependencies attended. This was the first attempt at wide discussion of problems concerned with the systematics, ecology, toxicology, and biochemistry of invertebrate and vertebrate venomous animals in the USSR. Both basic and clinical problems were discussed. A second conference is to be convened in 1970 or 1971. [Abstracted from a report by O. P. Bogdanov, 1969, Zool. Zhr. 48(3):463; translation by Robert Winter.]

The HERPETOLOGISTS LEAGUE held its annual meeting, in conjunction with the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, at the Statler Hilton Hotel, Boston, 28-29 December 1969. Twenty-five papers were presented -- five of these as joint papers with the AMERICAN SOCIETY OF ZOOLOGISTS Division of Vertebrate Morphology.

In spite of this joint presentation, a large number of conflicting presentations occurred during the simultaneous meetings of the SOCIETY FOR THE STUDY OF EVOLUTION, 27-30 December, and various other divisions of the ASZ. These and the ECOLOGICAL SOCIETY OF AMERICA presented a total of 54 papers dealing with amphibians

and reptiles. This presented herpetologists with such choices as "Species recognition among Southeastern hylid frogs," by H. Carl Gerhardt (SSE), "Comparative myology in the species of Batrachoseps," by Wilmer W. Tanner (HL), and "Systematic comparisons of American Frogs of the Family Microhylidae and the problems of consistency in anuran classification," by C. E. Nelson (SSZ) -- all held in the early afternoon of 28 December.

The SECOND INTERNATIONAL SYMPOSIUM ON ANIMAL AND PLANT TOXINS (and the Annual Meeting of the INTERNATIONAL SOCIETY OF TOXINOLOGISTS) was held in Tel Aviv, Israel, 22-28 February 1970. Some 100 participants from 22 countries were listed on the program. Most of the 55 papers of herpetological interest related to snake venoms and antivenins. However, such papers as "Distribution of venomous snakes in Israel," by H. Mendelssohn, "Snake locomotion," by C. Gans, "Lung reduction in some poisonous Indian snakes," by P. J. Deoras, and "On the toxin of Bombina variegata," by H. Michl emphasize that the Society has broader interests.

INDIVIDUALS AND INSTITUTIONS

ROBERT BOORD (morphology, U. Delaware) is on sabbatical, studying central connections of lateral line and acoustic nerves in amphibians. EDMUND D. BRODIE, JR. (frog ecology) moved to Clemson U., Clemson, South Carolina in September, 1969. JAMES L DOBIE (turtle morphology, Auburn U., Auburn, Ala.) "will soon describe a new dermatemidid turtle genus" from the Upper Cretaceous of Alabama. HARLOW K. FISCHMAN (snake chromosomes) moved to Opthalmic Research, College of Physicians and Surgeons, Columbia U., N.Y., as of September, 1969. JAMES MOULTON (morphology, Bowdoin C., Brunswick, Maine), among other things is taking "a new look at regeneration of amphibian limbs." Dr. & Mrs. MURRAY NEWMAN left for a two-and-a-half-month visit to Australia on 30 October 1969. They hope to collect some crocodiles for the Vancouver Public Aquarium on their visit. HERBERT ROSENBERG (morphology) has moved to U. Calgary, Alberta, Canada, where he is looking into feeding mechanisms of snakes and amphibian locomotion. Dr. HEINZ WERMUTH (reptile systematics) was inadvertently ommitted from the list of Sustaining Members of SSAR in a recent issue of Herpetological Review. WALTER AUFFENBERG (ethology, paleontology; U. Florida) is on Komodo Island (East Indies) for a year, investigating the status of Varanus komodoensis. GEORGE C. GORMAN (cytogenetics, U. California) will be at the Hebrew University of Jerusalem (Israel) for a year, studying chromosomes in Lacerta. And among the Queen's New Year's honors list was ERIC WORRELL, Australian herpetologist of New South Wales, who received the M.B.E. (Member of the Order of the British Empire).

There were several changes this Centennial Year at the AMERICAN MUSEUM OF NATURAL HISTORY. CHARLES M. BOGERT, longtime chairman of the Department of Herpetology, retired to Santa Fe, New Mexico. RICHARD G. ZWEIFEL (frog systematics) assumed the departmental chairmanship. CHARLES W. MYERS (snake systematics, from U. Kansas) and CHARLES J. COLE (lizard chromosomes, from U. Arizona) came in as assistant curators. Also, EDWIN J. COLBERT (reptile paleontology) retired from the Department of Vertebrate Paleontology (see story elsewhere in this issue).

At the U. S. NATIONAL MUSEUM publication of the "Catalogue of Neotropical Squamata" was announced by JAMES A. PETERS. It is to appear 20 February 1970: Part I, Snakes (341 p.) by Peters and BRAULIO R. OREJAS-MIRANDA, Part II. Lizards and Amphisbaenians (291 p.) by Peters and ROBERTO DONOSO-BARROS. The publication (Bull. U.S. Nat. Mus. (297)) is to have widespread distribution from an expanded mailing list of the Museum.

The AMERICAN MUSEUM OF NATURAL HISTORY announces the availability of grants from its THEODORE ROOSEVELT MEMORIAL FUND. These grants to "younger scientists," especially graduate students, may be used for travel and living expenses incurred in investigations on the North American fauna anywhere in the United States or Canada (including the Museum and its field stations). Write the Director of the Museum for additional information. Deadline for applications is 15 April.

The UNIVERSITY OF VIRGINIA announced that herpetology will be one of eight graduate field courses offered at the MOUNTAIN LAKE BIOLOGICAL STATION in the first term this summer (10 June - 14 July). Some NSF awards are available (application deadline is 1 May).

The JAPAN SNAKE INSTITUTE initiated its publication, The Snake, in August 1969. The first issue (vol. 1, no. 1) contains nine major articles, plus notes. The text is in Japanese; most of the articles have English abstracts. Articles mainly relate to venomous snakes but range from "Snakebites on Taiwan" to [unexpectedly] "A simplified method of the breeding of Xenopus laevis."

new books & reprints

SIERRA NEVADA AMPHIBIANS. By Harold E. Basey. 1969. The Sequoia Natural History Association, Inc., Three Rivers, California 93271. ii-iv + 27 pp., 17 color photographs (including cover picture), 1 fig. $1.45.

This booklet is an excellent popular regional guide and the color photographs are mostly of superb quality. The author organizes his work into the following sections: Introduction, What are amphibians, Interest in Sierran amphibians, Conservation, The Sierra Nevada, Where and when are amphibians observed, Courtship and mating, Eggs, The young, Metamorphosis, Ecology, Learning more about amphibians, Species accounts, Checklist and classification of Sierran amphibians, and a final back page for Field notes. Mr. Basey decided not to include two species accounts, Rana pipiens (Leopard Frog) and Taricha granulosa (Rough-skinned Newt), as they occur only at the periphery of the Sierra Nevada region.

The information presented is factual and easily readable by the layman. However, it was unfortunate that Mr. Basey's publication was in press at the time of the description of the Relictual Slender Salamander (Batrachoseps relictus) as this species, described in mid-1968, is represented in the photograph as the California Slender Salamander (Batrachoseps attenuatus). Also, the habitat description and activity periods given are largely for B. attenuatus. B. relictus occurs at higher elevations, generally 1500-8000 feet, occurs predominately under surface material at the sides of brooks, lays its eggs during the summer months, and is generally active most all year around.

It would have been useful if the author had included the scientific names below the common names. In only a few instances is the scientific name mentioned within the species account. However, the readers can refer to the checklist and classification of Sierran amphibians at the end of the publication for scientific names. In spite of the few drawbacks, I highly recommend this popular guide to herpetologists and any layman interested in amphibians or the Sierra Nevada.

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NEW FACSIMILE REPRINTS

Anatome Testudinis Europaeae by L. H. Bojanus. A facsimile reprint of this classic in turtle anatomy was issued by the SSAR in February 1970. Originally issued in an edition of 80 copies at Wilna, Lithuania, in 1819-1821; 250 pages, 41 plates (folio). The reprint includes an introduction by Alfred S. Romer. Prices to SSAR members, $13.00 paperbound, $15.00 cloth; price to institutions and non-members, $18.00 and $20.00 respectively.

* * *

Sowerby and Lear's Tortoises, Terrapins and Turtles, although first issued in 1872, remains the finest atlas of turtle illustration ever produced. In addition to 60 8 1/2 x 11-inch plates, the reprint will include an introduction by Ernest Williams which brings the nomenclature up-to-date. Prices to individuals $9 paperbound, $10 clothbound; institutions, $14 and $15, respectively. To be issued fall 1970.

* * *

Camp's Classification of Lizards, the foundation for modern lizard systematics, has long been out-of-print. The reprint will include a preface by Charles L. Camp, an introduction by Garth Underwood analyzing Camp's work in view of recent research, and an index. Prices to individuals $11 paperbound, $12 clothbound; institutions $16 and $17 respectively. To be issued winter 1970-1971.

* * *

Books may be ordered from Dr. Henri C. Seibert, Publications Secretary, SSAR, Department of Zoology, Ohio University, Athens, Ohio 45701, U.S.A. A pricelist of other Facsimile Reprints in Herpetology, as well as other Society publications, may be obtained upon request.

A BIG YEAR FOR ALLIGATORS

The year 1969 would appear, at least on paper, to mark the turning point in conservation efforts to save the American alligator (*Alligator mississippiensis*) from almost certain extinction in the 1970's. Already, wildlife management personnel had reported reduction of Florida alligators to a fraction of their previous numbers: 10 per cent of their 1960 populations in Everglades National Park, ONE per cent in other areas.

The factors that had influenced this drastic decline had included the diversion of the normal flow of water from the Okeechobee region, the severe drought of the mid-sixties, and the "prevalence of people." The main reason, though, was the omnipresent hide-hunter. With the fashion world stimulating the use of alligator skin handbags ($275), shoes ($75), and even attache cases ($1,250), the price of raw alligator belly-skins attained a high of at least $10 per linear foot in 1969.

This meant that poaching really paid during the sixties. There are few other professions in which an uneducated man, with an investment of only a flashlight and a rifle (a boat is handy, but not essential), can earn $200 to $400 in a night's work. Even if the hunter was captured by the authorities in a place where the activity was blatently illegal (e.g., in the Park), and with light, rifle, and dead alligators in hand, it was still difficult to get a poacher convicted in the Florida courts. Or if he was convicted, the fine was set so low that another night's work would more than rectify the financial loss.

However, on 5 December 1969 President Nixon signed into law (Public Law 91-135) an Act "To prevent the importation of endangered species of fish or wildlife into the United States; to prevent the interstate shipment of reptiles, amphibians, and other wildlife taken contrary to State law; and for other purposes." This law (to become effective 180 days after the date of enactment) makes it illegal for anyone to import or to ship across state lines any animal or animal product which has been taken illegally, either in the United States or in a foreign country. Because Georgia was the last state within the natural range of alligators to make their killing illegal (in 1968), it is now made clear that ANY American alligator or alligator product is prohibited from importation or interstate commerce.

At about the same time, Mayor Lindsay of New York signed into law (Local Law 943-1124) a bill making it illegal for anyone to "possess for sale any American alligator object or American alligator" within the City (a fashion stronghold) after 1 July 1970. It also makes it necessary for importers to keep records of the origin of hides and that all products made from crocodilian skins be marked, "Not made from American alligator skin."

Added to the even more recent decision against the building of the Everglades jetport, the actions taken in 1969 would appear to offer adequate protection to those American alligators that survive until next July. Initially, these laws may bring more pressure by hide hunters on crocodilian populations in other parts of the world.

However, laws for crocodilian protection are appearing in what seemed to be unlikely places (see figure), and perhaps some of the "more civilized" countries will follow suit. Perhaps within the decade, the only crocodilian skins will come from animals that have been farmed for that purpose.



"1969 LAW ABOUT CROCODILES"

"Let the big crocodiles live.
You cannot sell the skins from
big crocodiles any more."
"You can sell skins of little
crocodiles, that is all."
[A New Guinea poster in Pidgin-
English and Motu.]

ADVICE TO AUTHORS

Herpetological Review publishes feature articles that pertain to amphibians and reptiles, the people who study them, and the relevant societies and institutions. It is not intended as an outlet for reporting the results of research on these animals (but see "Unreviewed-Unedited"). Articles describing (and/or photographs illustrating) rareties, expeditions, laboratories, societies, museums, and historical articles that pertain to herpetological study are especially welcome. We would also appreciate news for the various Departments.

FORMAT. Manuscripts should be typewritten on white bond paper. All material, including legends for figures and literature cited, is to be double-spaced. Scientific names of genera and species are underlined. Titles should indicate clearly the subject and animal group(s) included. Use standard abbreviations for journals. See the special instructions for "Unreviewed-Unedited Communications."

The following publications will be of assistance in the preparation of manuscripts:

Catalogue of American Amphibians and Reptiles (Herpetological Catalogue Committee, American Museum of Natural History, New York, N. Y. 10024). $16.

Common names for North American amphibians and reptiles (Copeia 1956(3):172-185).

Scientific Writing for Graduate Students, by F. Peter Woodford (Rockefeller University Press, New York, N. Y. 10021). $5.75.

Biological Abstracts List of Serials with Title Abbreviations (BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania 19103). $10.

Style Manual for Biological Journals (American Institute of Biological Sciences, 3900 Wisconsin Avenue, NW, Washington, D.C. 20016). $3.00.

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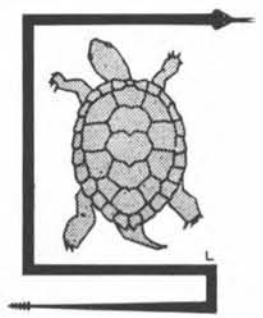
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A publication that will be found helpful in planning and producing adequate illustrations is:

A Handbook for Biological Illustration, by Frances W. Zweifel (University of Chicago Press, Chicago, Illinois). $1.95.

PROOFS AND SEPARATES. Proofs will be sent to each contributor. Author's separates are made available at reasonable rates, and may be ordered when proof is returned.



CATALOGUE OF AMERICAN AMPHIBIANS AND REPTILES

Accounts 81 - 90 of the Catalogue were published on 16 January 1970. These include:

81. Ambystoma mabeei. By Jerry D. Hardy and James D. Anderson.
82. Plethodon dunni. By Robert M. Storm and Edmund D. Brodie, Jr.
83. Plethodon vehiculum. By Robert M. Storm and Edmund D. Brodie, Jr.
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85. Scaphiopus couchii. By Aaron O. Wasserman.
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87. Hemidactylus turcicus. By C.J. McCoy.
88. Coleonyx brevis. By James R. Dixon.
89. Coleonyx reticulatus. By James R. Dixon.
90. Sphaerodactylus notatus. By Albert Schwartz.

Another ten accounts are expected to appear by June 1970.

For additional information, write:
Herpetological Catalogue Committee
American Museum of Natural History
New York, N. Y. 10024

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COPEIA 1969(3):602-612, 2 FIG., 7 TAB.

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Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor.

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Herpetological Review

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EDITOR - JOSEPH T. COLLINS

•CONTENTS

3 Report on Society's 12th annual meeting at Carbondale, Illinois.

5 Walter Ray Moberly, 1941 - 1969, by William A. Dunson and Kraig Adler.

6 Society officers elected for 1970.

6 Members desiderata.

6 Important notice regarding SSAR life membership.

6 New books and reprints.

7 Herpetology at the University of Kansas.

9 Current Herpetological Titles, VIII: 1968 - 1969.

31 Future meeting - 1970.

REPORT ON SOCIETY'S 12th ANNUAL MEETING

The Society's Twelfth Annual Meeting was held 5-7 September 1969 at the Carbondale campus of Southern Illinois University. Ninety persons attended. Society Chairman N. Bayard Green opened the meeting by introducing Dr. Robert MacVicar, SIU Chancellor, who gave the welcoming address. Some two dozen papers were presented, including invited talks by William D. Schmid and Arnold G. Kluge on the application of special techniques to studies of amphibians and reptiles; abstracts of papers appear in Journal of Herpetology, vol. 3, nos. 3-4. Philip W. Smith, James E. Huheey, James C. List and James L. Vial presided over the paper sessions.

The Board of Directors met Friday evening; the following were present: N. Bayard Green, Joseph T. Collins, James C. List, J. P. Kennedy, R. E. Gordon, Lowell P. Orr and Ronald A. Brandon. Thirty-one items were discussed at the Board of Directors meeting. Some of the more important proposals passed were: 1) that Life membership dues be increased from $100. 00 to $150. 00 effective 1 January 1971; 2) that Herpetological Review be offered for sale as a back issue at $1. 50 per copy; 3) that abstracts of future papers presented at SSAR meetings not be published in the Journal of Herpetology; and 4) that Herndon G. Dowling (American Museum of Natural History) be appointed as the new editor of Herpetological Review effective 1 January 1970.

At the business meeting on Sunday, the proposed constitution was passed; this will be printed in Volume 4 of the Journal. In addition, the following resolutions were read by Resolutions Committee Chairman Lowell P. Orr:

WHEREAS, the Chancellor of Southern Illinois University, Carbondale, Dr. Robert MacVicar, in his remarks opening the 12th Annual Meeting of the Society for the Study of Amphibians and Reptiles, pointed out the recent cooperative activity between the Federation of American Societies for Experimental Biology and the American Institute of Biological Sciences in development of the American Biological Council, to speak with a united voice for the life sciences in the United States, and

WHEREAS, the Society for the Study of Amphibians and Reptiles views this union as a most progressive and needed step, be it therefore

RESOLVED, that the Society for the Study of Amphibians and Reptiles go on record in support of this action and extend to the appropriate individuals its commendation for this forward step.

WHEREAS, Dr. N. Bayard Green has guided the Society for the past two years as its chairman with unusual efficiency and dedication, be it therefore

RESOLVED, that the Society for the Study of Amphibians and Reptiles extend to him its utmost appreciation for a job well done.

WHEREAS, Mr. Joseph T. Collins has effectively served the Society for the Study of Amphibians and Reptiles as one of its most loyal and prodigious workers as secretary-treasurer and editor of Herpetological Review, and

WHEREAS, he has recently submitted his resignation for the latter position, be it therefore

RESOLVED, that the Society for the Study of Amphibians and Reptiles express to Mr. Collins its profound appreciation for his outstanding service to the Society as editor of Herpetological Review for the past two years.

WHEREAS, Dr. Robert E. Gordon and his constitution committee consisting of Drs. Carl Gans, J. P. Kennedy, C. J. McCoy, and David Wake have worked hard and long in structuring a sound constitution and by-laws for the Society for the Study of Amphibians and Reptiles, be it therefore

RESOLVED, that these individuals receive our heartfelt thanks for performing their arduous and important task in a most professional manner.

WHEREAS, the nominating committee chaired by Dr. James C. List and consisting of Mr. David M. Dennis, Dr. James Fowler, Dr. James A. MacMahon, and Dr. Joseph Tihen has presented a distinguished list of nominees for the various offices of the Society for the Study of Amphibians and Reptiles, be it therefore

RESOLVED, that the Society for the Study of Amphibians and Reptiles hereby express its deep appreciation to the committee for their services.

WHEREAS, Dr. James Vial conducted one of the most successful membership campaigns during 1969 that the Society for the Study of Amphibians and Reptiles has ever experienced, be it therefore

RESOLVED, that the Society for the Study of Amphibians and Reptiles express to Dr. Vial its congratulations and deepest appreciation for the excellent job he has done.

WHEREAS, the 12th annual meeting of the Society for the Study of Amphibians and Reptiles must be considered as one of the most successful and enjoyable of all meetings of the Society, in spite of rain guaranteed not to fall, and

WHEREAS, the success of the meeting was in large part due to careful planning and superb efficiency by the local committee, be it therefore

RESOLVED, that the Society for the Study of Amphibians and Reptiles express its sincere appreciation to the local committee consisting of Dr. Ronald A. Brandon (Chairman) and his assistants Dr. Ronald G. Altig, Dr. Joseph A. Beatty, Mr. and Mrs. Joseph Besharse, Mr. and Mrs. Ralph Brandon, Miss Pat Collins, Dr. William George, Mr. William Griffith, Mr. and Mrs. Thomas Harris, Dr. James E. Huheey, Dr. Willard D. Klimstra, Dr. John N. Krull, Dr. Eugene A. LeFebvre, Mr. Ray Schaaf, and Dr. Philip W. Smith.

Finally, we would like to thank Dr. Edward H. Taylor for showing the younger members of this very young Society how its done. His skillful blending of humor, enthusiasm, and scholarship will long be remembered as a high point of the 12th Annual Meeting of the SSAR.

Saturday evening a chicken barbeque supper and social were held at SIU's outdoor laboratory at Little Grassy Lake. Several herpetological slide travelogues were shown, including one of the Far East by Robert Gordon. Ronald Altig organized a fine photographic and slide show during the meeting, which included materials from Jeffrey Black, Edmund D. Brodie, Jr., Joseph T. Collins, Glenn Gentry, Harry Greene, John Hess, J. P. Kennedy, Jeffrey Lang, James C. List, Craig E. Nelson, Raymond Schaaf, Philip W. Smith, Edward H. Taylor, and James Wernz.

The success of the meeting was due to the careful planning and imagination of Ronald Brandon and the members of his committee listed in the above resolution. The attractive campus, the excellent facilities and the well-executed program will be remembered. It was encouraging to see such a large number of graduate students in attendance and their papers this year were exceptionally good.



WALTER RAY MOBERLY, 1941-1969

Walter Moberly, assistant professor of biology at the University of Oregon, was killed in an automobile collision on July 22, 1969. Walt received his bachelor's degree (with high honors) at the University of California, Riverside, where he worked with Wilbur Mayhew. As a senior, Walt's promise was already apparent with his work on hibernation in the desert iguana, Dipsosaurus. Leaving his native California which he held in great affection, Walt went east for graduate study at The University of Michigan with William Dawson. He was a respected member of the graduate student body and those of us who were there during that period will remember his frank humor, the generosity with his own time, and particularly his broad interest in biology. Walt's thesis research on metabolism and thermoregulation in the common iguana, Iguana, demonstrated his keen interest in reptiles and his knack for attacking a fundamental biological problem, the origin of homeothermy. He had an inventive and sharp mind and he developed some particularly elegant experiments to investigate the metabolic capacity for work in the iguana. One technique involved teaching four-foot-long iguanas to walk on a treadmill at variable speeds while metabolic rate was measured with a mask fitted to the head; an electric shock to the tail provided the motivation for learning! It was not enough for him to measure heart rates or oxygen debts in the lab; Walt wanted to know whether his measurements meant anything to the lizards. Thus, his work on iguanas naturally took him to the tropics where he enjoyed catching his own animals. He would send an assistant up a tree to force the lizards to jump; Walt would wait below to catch the animals during those few vulnerable seconds after they hit the ground. Most of this work was done along the Río Raposo in Colombia (photo; Walt is second from left).

After receiving his Ph. D. in 1966, Walt returned to the west coast by taking the position at Oregon. During the summer of 1969 he taught a course in comparative physiology at the University's Institute of Marine Biology at Charleston; it was on one of his commuting trips to teach there that he was killed. Walt was a rare individual who possessed great intellectual ability in combination with a very likable manner. He will be affectionately remembered by those who knew him. This will include the person who lost a five-dollar bet to Walt after a costume party at which Walt was dressed in a colonial white wig and baggy black pants. For the five dollars, Walt had to wear his costume to school for a whole day, which he did to everyone's amusement. Walt's tragic death at this early stage in a productive career is a profound sorrow.

A memorial fund has been established in Walt's name at Oregon to provide scholarships at the marine institute he served so well. Contributions may be addressed to the University of Oregon Development Fund, Eugene, Oregon 97403, to the account of the "Walter Moberly Memorial."

----- WILLIAM A. DUNSON and KRAIG ADLER.



SOCIETY OFFICERS ELECTED FOR 1970

Ballots for offices for the SSAR have been tabulated and a report submitted by Dr. William E. Duellman (Election Chairman). The following persons have been elected to serve for calendar 1970:

CHAIRMAN
Ronald A. Brandon
Southern Illinois University
Carbondale

CHAIRMAN-ELECT
Robert E. Gordon
University of Notre Dame
Indiana

SECRETARY
Joseph T. Collins
Museum of Natural History
University of Kansas

TREASURER
Henri C. Seibert
Ohio University
Athens

DIRECTORS
James R. Dixon
Texas A & M University

Richard Etheridge
San Diego State College

Sherman A. Minton, Jr.
Indiana University Medical Center

George R. Zug
Smithsonian Institution

MEMBER'S DESIDERATA

Cornell University needs specimens of amphibians and reptiles for a herpetology teaching collection. Families and genera from South America, Europe, Africa, Asia, and Australia are particularly needed. Specimens from the Ithaca, New York area are available for exchange. Persons or institutions interested should contact: Dr. F. Harvey Pough, Section of Ecology and Systematics, Langmuir Laboratory, Cornell University, Ithaca, New York 14850.

IMPORTANT NOTICE

As per the recent decision of the SSAR Board of Directors, dues for Life Membership in the Society for the Study of Amphibians and Reptiles will be increased from $100.00 to $150.00 effective 1 January 1971. All persons planning to join at this category are urged to do so before the above date in order to take advantage of the lower rate. Life membership dues will be received and handled during 1970 by: Joseph T. Collins, Secretary-SSAR, Museum of Natural History, University of Kansas, Lawrence, Kansas 66044.

NEW BOOKS & REPRINTS

Sierra Nevada Amphibians by Harold Basey. 1969. 27 pages, 16 color plates. Available postpaid for $1.45 from: Sequoia Natural History Association, Three Rivers, California 93271.

Anatome Testudinis Europaeae by L. H. Bojanus. 1819-1821. 250 pages, 41 plates. An SSAR reprint will include an introduction by Alfred S. Romer. Prepublication prices to SSAR members: $13.00 paperbound, $15.00 cloth; price to institutions and non-members: $18.00 and $20.00 respectively. Available from: Dr. Henri Seibert, SSAR, Department of Zoology, Ohio University, Athens, Ohio 45701.

Venomous Animals and Their Venoms edited by Wolfgang Bucherl, Eleanor E. Buckley, and Venancio Deulofeu. Volume 1, Venomous Vertebrates, 1967. 707 p. Available for $34.00 from: Academic Press, 111 Fifth Avenue, New York, New York 10003.

A Review of the Water Snakes of the Genus Natrix in Mexico by Roger Conant. 1969. Bull. American Mus. Nat. Hist. 142 (1): 1-140, 22 plates, 6 maps. Available for $8.00 from: American Museum of Natural History, Central Park West at 79th Street, New York 10024.

The Origin of Terrestrial Vertebrates by I. I. Schmalhausen. Translated from Russian by Leon Kelso with preface by Carl Gans. 1968. 314 p. Available for $15.00 from: Academic Press (see address above).

Skulls of Gymnophiona and their Significance in the Taxonomy of the Group by Edward H. Taylor. 1969. Univ. Kansas Sci. Bull. 48 (15): 585-687. Available for ca. $1.60 from: Univ. Kansas Libraries, Lawrence, Kansas 66044.

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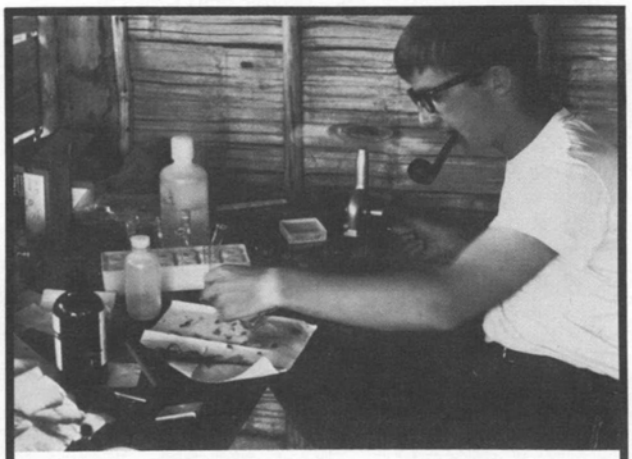
The University of Kansas has had a long history of research in systematics and ecology of amphibians and reptiles. The facilities and staff of the Museum of Natural History and the Natural History Reservation are now combined with part of the former Department of Zoology into the new academic Department of Systematics and Ecology of the Division of Biological Sciences. This department has 24 faculty members. Currently 57 graduate students are enrolled in the department; nine of these are working on problems dealing with amphibians and reptiles.

The Division of Herpetology of the Museum of Natural History under the curatorship of Dr. William E. Duellman contains a collection of 125,500 specimens, including a large number of skeletal preparations. An outstanding herpetological library and extensive collection of tape recordings are housed in the museum. A sound analysis laboratory, histology laboratory, constant temperature units, and cytology laboratory complete the physical facilities of the Division. Research by the staff and students in the Division is highly varied and ranges from studies on the cranial anatomy of frogs under the direction of Research Associate, Dr. Linda Trueb, to numerical taxonomy of collared lizards, genus Crotaphytus, by graduate student Richard R. Montanucci.

An important aspect of the research carried out by members of the Division concerns the systematics and ecology of tropical herpetofaunas; interests and field work range from México to Perú and Brasil. Every graduate student and all staff members have worked in Latin America for varied lengths of time. Three years ago a field study of an Amazonian herpetofauna was initiated at Santa Cecilia, Ecuador. The resulting field station, Muñozlandia, has been visited by three staff members and six graduate students, who have spent an accumulated 20 man-months in the field there.



Field party - Munozlandia, Ecuador; left to right: Linda Trueb, Charles Walker (University of Michigan), Ildefonso Munoz B. (owner of Munozlandia), William E. Duellman, and Thomas H. Fritts.



Chromosome preparations are made from centrifuged bone marrow by Thomas H. Fritts at laboratory at Munozlandia in Ecuador.

Research and travel funds provided by the University of Kansas enable students to carry out extensive field work or travel to other museums for study of material. Accordingly, three graduate students have either just completed, or are carrying out, field work in the tropics: Martha L. Crump just returned from seven months of study on the ecology of amphibians at the Area de Pesquisas Ecológicas do Guamá near Belém, Brasil; Janalee P. Caldwell has started a one year field study of resource partitioning in frogs in Oaxaca, México; Thomas H. Fritts is now in Perú for a year studying speciation in the Andean iguanid lizards of the genus Ophryoessoides.

Additional research on Neotropical amphibians and reptiles includes the systematics of frogs, genus Colostethus, by graduate student Stephen R. Edwards; the evolutionary relationships of some South American montane toads by Dr. Linda Trueb, and reproductive cycles in certain Costa Rica lizards by Dr. Henry Fitch. Dr. William E. Duellman has an extensive research program on South American hylid frogs and is working with Charles W. Myers on the amphibians and reptiles of Panamá.

The Natural History Reservation, under the custodianship of Dr. Henry S. Fitch, is a 590 acre tract of land 7 miles northeast of the main campus. Although the Reservation is utilized for a wide variety of studies on the biota of northeastern Kansas, it is particularly well known for the number of studies by Fitch and graduate students on the life history and population ecology of amphibians and reptiles. Currently Fitch is completing a long-term study of the ring-necked snake, Diadophis punctatus arnyi; graduate student Arnold K. Smith is working on a population study of the bullfrog, Rana catesbeiana. Supplementing classical techniques of study is the new radio-telemetry equipment installed on the Reservation.

Professor Emeritus, Edward H. Taylor maintains an active research program on caecilians in the Museum of Natural History, and Dr. Theodore H. Eaton, Curator of Lower Vertebrate Paleontology is involved in various studies of Paleozoic amphibians and reptiles.

The University of Kansas has a large well-equipped Computation Center that provides a variety of data processing systems. Results of research by staff and students are published in numerous journals and in two University series--University of Kansas Publications, Museum of Natural History, and University of Kansas Science Bulletin.



Linda Trueb and Martha L. Crump prepare serial sections of frog skulls on a sliding hand microtome.



Photomicrographs of collared lizard chromosomes are taken by Richard R. Montanucci as part of his cytotaxonomic studies.



Edward H. Taylor makes active use of the herpetological libraries containing more than 2000 bound volumes and 10,000 reprints.



Joseph T. Collins examines specimens in the collection.



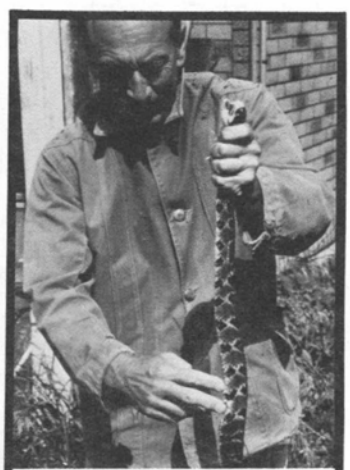
Audiospectrographic analysis of mating calls is a part of Stephen R. Edwards doctoral research on Colostethus.



Stephen R. Edwards consults with William E. Duellman about his research problems.



William E. Duellman and Joseph T. Collins discuss a curatorial problem of snake skeletons.



Henry S. Fitch notes position of recently swallowed radio transmitter in a timber rattlesnake on the Natural History Reservation.

CURRENT HERPETOLOGICAL TITLES, VIII: 1968-69

HERPETOLOGICAL INFORMATION SEARCH SYSTEMS

American Museum of Natural History
New York, N.Y. 10024

* * * * *

This is the seventh list that contains titles of books and articles relating to the field of herpetology that were published in 1968 and 1969. The 114 titles listed here brings the total for 1968 to 3,738, almost 50 per cent more than we estimated in 1967, and some 20 per cent more than we estimated last year (see Figure). And 1968 titles are continuing to come in! It may be that the final total for that year will approach 4,000.

Though we will continue to enter titles published during 1968 on the computer-tape memory, on the basis that two-year-old literature is no longer current, we will not publish these titles in forthcoming lists.

We realize that many of the titles listed are marginal to the field of herpetology as customarily defined. Many are published in journals of physiology, pharmacology, cytology, or embryology. Others are from medical journals, state fish and game publications, or pet animal journals. Thus, they are not aimed at an audience of herpetologists. All of them, however, deal in some way with amphibians and reptiles. As such, they may be of some interest to at least some readers of HERPETOLOGICAL REVIEW. It seems better to let the reader make the selection from the list, rather than one of our small group deciding that this paper or that -- or this kind of paper -- is of no interest to anyone.

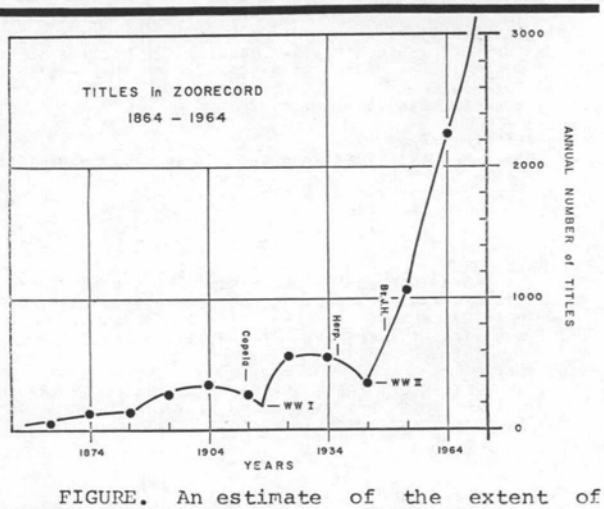


FIGURE. An estimate of the extent of herpetological literature based on counts of titles listed in the Amphibia and Reptilia sections of Zoological Record. Prepared in 1966, the figure has proven to show the trend, but not the extent of recent herpetological literature.

Our present policy, then, is to list the title of any paper that is concerned with a member of a Recent order of amphibians or reptiles.

Except for the omission of extinct orders, our list is comparable with that of the Amphibia and Reptilia sections of the Zoological Record, though ours is more comprehensive. We have published 7,619 "Current Titles" since January 1968.

This eighth list contains titles of books and articles that have come to our attention during the period 26 July through 17 October 1969. It is divided into two separate, alphabetically-arranged sections: one for titles published in 1968, and one for titles published in 1969.

Acknowledgements. This list was prepared by the HISS staff: H. G. Dowling, I. Gilboa, I. Palser, and T. Shaman. J. A. Peters of the U. S. National Museum has continued to provide a welcome back-up program to our search of the literature, and G. J. Jacobs of NASA has kept us informed of the many publications and translations resulting from the United States space efforts. We also wish to thank the many individuals who have sent us early copies of reprints for inclusion here.

Members of the Herpetology Department and the Library staff of the Museum have continued to aid our efforts. No commercial computer service yet offers all of the facilities that we need, however, and we continue to rely on the advice and aid of James E. Bradley of the University of Rhode Island Computer Laboratory. We are grateful to all of these individuals and institutions for their help.

This is contribution Number 15 of the Genera of Reptiles Project, which is supported by the Information Services Program of the National Science Foundation (NSF GN-707).

--- A ---

ANGEL,L.MADELINE AND PATRICIA M.MAWSON
1968 HELMINTHS FROM SOME LIZARDS MOSTLY FROM SOUTH AUSTRALIA
TRANS ROY SOC S AUST 92:59-72, 21 FIG., 3 TAB.

ANON
1968 REPTILES AND AMPHIBIANS
NAT MUS NAIROBI REP 1967-1968:14-15, 20-23.

ANON
1968 REPTILES AND AMPHIBIANS
ANNU REP WEST AUST MUS 1966-67:36.

ANON
1968 TYPE SPECIMENS IN THE WESTERN AUSTRALIAN MUSEUM
ANNU REP WEST AUST MUS 1966-67:59.

APILLO,ATTILIO AND MARIA ADELAIDE CHERCHI
1968 ALCUNI ASPETTI METABOLICI OSSERVATI IN TESTUDO HERMANNI GMELIN IN SEGUITO A RIALZO TERMICO
BOLL ZOOL 34:82-83. (ITAL)

ASAO,TEZRO
1968 ISOLATION OF NUCLEI FROM TRITURUS PYRRHOGASTER EMBRYOS
J FAC SCI UNIV TOKYO SECT IV ZOOL 11(3):459-463, 2 FIG., 2 TAB. (ENGL)

ASAO,TEZRO
1968 THE VARIATION OF CELL NUMBER DURING DEVELOPMENT OF TRITURUS PYRRHOGASTER EMBRYO
J FAC SCI UNIV TOKYO SECT IV ZOOL 11(3):453-458, 3 FIG., 1 TAB. (ENGL)

AVE,KIICHIRO, NAOI SASAKI AND IZUMI KAWAKAMI
1968 ACTIVE GROUPS OF THE PROTEINS EVOKING PRIMARY DIFFERENTIATION IN AMPHIBIANS. II. MESODERM-INDUCTIVE PROTEIN
MEM FAC SCI KYUSHU UNIV SER E BIOL 5(1):39-47, 1 FIG., 1 TAB. (ENGL)

AVE,KIICHIRO, NAOI SASAKI AND IZUMI KAWAKAMI
1968 ACTIVE GROUPS OF THE PROTEINS EVOKING PRIMARY DIFFERENTIATION IN AMPHIBIANS. I. NEURO-INDUCTIVE PROTEIN
MEM FAC SCI KYUSHU UNIV SER E BIOL 5(1):25-38, 1 FIG., 2 TAB. (ENGL)

AVERY,R.A.
1968 FOOD AND FEEDING RELATIONS OF THREE SPECIES OF TRITURUS (AMPHIBIA URODELA) DURING THE AQUATIC PHASES
OIKOS 19(2):408-412, 1 FIG., 1 TAB. (ENGL)

--- B ---

BACHMAYER,FRIEDRICH
1968 (REVIEW OF) AMPHIBIEN UND REPTILIEN, KATALOG DER SUBFAMILIEN UND HOEHEREN TAXA MIT NACHWEIS DES ERSTEN AUFTRETENS BY OSKAR KUHN, 1967
ANN NATURHIST MUS WEIN 72:720-721. (GER)

BACULI,BUENA S. AND EDWIN L.COOPER
1968 LYMPHOMYELOID ORGANS OF AMPHIBIA. IV. NORMAL HISTOLOGY IN LARVAL AND ADULT RANA CATESBEIANA
J MORPHOL 126(4):463-475, 3 PL.

BAKER-COHEN,K.FRANCE
1968 COMPARATIVE ENZYME HISTOCHEMICAL OBSERVATIONS ON SUBMAMMALIAN BRAINS
ERGEB ANAT ENTWINCKL 40(6):7-70, 92 FIG. (ENGL)

BANI,GASTONE
1968 CELLULE PARTICOLARI NELL'EPIDERMIDE DI TRITONE (TRITURUS CRISTATUS CARNIFEX LAUR.)
BOLL ZOOL 34:87-88. (ITAL)

BENNETT,CHARLES F.
1968 HUMAN INFLUENCES ON THE ZOOGEOGRAPHY OF PANAMA
IBERO-AMER (51):1-112, 1 FIG., 10 TAB., 8 MAPS.

BHATTACHARYA,A.K. AND R.K.BHATNAGAR
1968 UNUSUAL BEHAVIOUR OF TWO MALE RAT SNAKES, PTYAS MUCOSUS (LINN.)
J BOMBAY NATUR HIST SOC 65(2):492.

BHATNAGAR,R.K.
1968 OCCURRENCE OF THE SNAKE TYPHLOPS DIARDI SCHLEGEL IN THE DUN VALLEY
J BOMBAY NATUR HIST SOC 65(2):491.

BOURGAT,ROBERT
1968 RECHERCHES SUR LES VARIATIONS ANNUELLES DE LA SPERMATOGENESE CHEZ LE CHAMAELEO PARDALIS CUVIER DE L'ILE DE LA REUNION
VIE MILIEU 19(2):497-501, ILLUS. (FR, ENGL SUMM)

BRODSKY,OTAKAR
1968 GEKO OBROVSKY (GEKKO GECKO L.) A JEHO CHOV
ZIVA 16(4):146-148, ILLUS. (CZECH)

--- C ---

CANDIOLLO,LUIGI AND RENZO GUGLIELMONE
1968 INNERVAZIONE MOTORIA E PROPRIOCETTIVA DEI MUSCOLI COSTO-CUTANEI INFERIORI IN BOA CONSTRICTOR (L.)
ISTITUTO LOMBARDO (REND SCI) B 102(1):105-112, 3 FIG. (ITAL)

CAPANNA,E.
1968 OSSERVAZIONI SUL SEMIALBINISMO DEGLI ANFIBI
BOLL ZOOL 34:100-101. (ITAL)

CHIEFFI,G., PRISCO C.DI LUPO AND G.DELRIO
1968 IDENTIFICAZIONE DEGLI ORMONI SESSUALI NEI CORPI GRASSI DI MASCHI DI TRITURUS CRISTATUS CARNIFEX
BOLL ZOOL 34:104-105. (ITAL)

COCITO,ANNA MARIA, GIULIA PONZETTI, CARLO GIUNTA AND ANTONIETTA GUARDABASSI
1968 MELANOGENESIS IN XENOPUS LAEVIS (DAUDIN) LARVAE UNDER NORMAL AND EXPERIMENTAL CONDITIONS
MONIT ZOOL ITAL 2(3-4):183-191, 5 FIG., 1 TAB. (ENGL)

COMBES,CLAUDE AND LOUIS-PHILIPPE KNOEPFFLER
1968 EUPROCTUS MONTANUS (SAVI, 1838), AMPHIBIEN URODELE ENDEMIQUE DE CORSE, HOTE NOUVEAU POUR UN ACANTHOCEPHALE ET UN TREMATODE DIGENE
VIE MILIEU 19(2):485-489, 1 FIG. (FR, ENGL SUMM)

CROGAN,WILLIAM L.,JR. AND LLOYD C.PACK,JR.
1968 NOTES ON REPRODUCTION IN LAMPROPELTIS TRIANGULUM AND COLUBER CONSTRICTOR IN UTAH
PROC UTAH ACAD SCI ARTS LETT 45(1):323. (TITLE ONLY)

--- D ---

DAAN,S.
1968 LATERAL BENDING IN LIZARD LOCOMOTION
NETH J ZOOL 18(3):428-429.

DANCASIU,M., L.CIMPEANU, AL.PETROVICI AND C.PENEA
1968 HYPOPHYSIS ULTRASTRUCTURE IN MALE EMYS ORBICULARIS DURING THE ANNUAL CYCLE
REV ROUM ENDOCRINOL 5(2):125-127, 5 FIG.
(FR, ENGL SUMM)

DELLA CORTE,F. AND F.ANGELINI
1968 PARTICOLARITA CITOLOGICHE DELL'ADENOIPOFISI DELLA LUCERTOLA (LACERTA S. SICULA RAF.)
BOLL ZOOL 34:113-114. (ITAL)

DELY,O.G.
1968 DIE WISSENSCHAFTLICHE UND LITERARISCHE TAETIGKEIT VON GEZA GYULA FEJERVARY AUF DEM GEBIETE DER ZOOLOGIE
VERTEBRATA HUNGARICA (BUDAPEST) 10(1-2):13-41 (GER), 42-43 (HUNG)

DEPAOLI,J.R. AND E.T.SEGURA
1968 DISTRIBUCION DE LIPIDOS EN EL CEREBRO DEL BUFO ARENARUM HENSEL
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FUTURE MEETINGS

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DEADLINE FOR HERPETOLOGICAL REVIEW

Material for Herpetological Review #9 (December 1969) can be accepted no later than 5 October 1969.

It is preferred that feature articles be submitted prior to the above deadline dates if possible.



Results of an explosive burst of reproduction following spring emergence from hibernation in the Australian burrowing leptodactylid Limnodynastes dorsalis (Gray). The frothy egg masses are each 12 - 18 cm in diameter and contain 3,000 - 4,000 eggs. Locality is a permanent pond 3 miles SW. of Petersons (about 35 miles NNE. of Melbourne), Victoria, Australia; 16 October 1966. Exposure Data: Praktica IV camera; Kodak Plus-X film; 1/50 sec. at f8. Photograph by A. A. Martin, Department of Zoology, University of Melbourne, Parkville, Victoria 3052, Australia.



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The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles.

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Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor.

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EDITOR - JOSEPH T. COLLINS

•CONTENTS

3 SSAR Acknowledges Support

4 New Books and Reprints

5 Book Review: Early Foundations of Mexican Herpetology, by Hobart M. Smith and Rozella B. Smith (J. P. Kennedy)

5 Herpetologist's League Meets

5 Members desiderata

6 News from Institutions: Notre Dame Herpetology Program

7 Current Herpetological Titles, VII: 1968-1969

33 Future SSAR Meetings

33 Deadline for Herpetological Review

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new books & reprints

Anatome Testudinis Europaeae by L. H. Bojanus. A facsimile reprint of this classic in turtle anatomy will be issued by the SSAR in winter 1969-70. Originally issued in an edition of 80 copies at Wilna, Lithuania, in 1819-1821; 250 pages, 41 plates (folio). The reprint will include an introduction by Alfred S. Romer. Prepublication prices to SSAR members, $13.00 paperbound, $15.00 cloth; price to institutions and non-members, $18.00 and $20.00 respectively. Please use the enclosed order blank; orders should be addressed to Henri C. Seibert, Department of Zoology, Ohio University, Athens, Ohio 45701.

Bibliography of the Chameleontidae (1864-1964) by Stephen D. Busack. 1969. 12 pages. Available from: Smithsonian Herpetological Information Service (SHIS), Division of Reptiles & Amphibians, U. S. National Museum, Washington, D. C. 20560.

Bibliography of the Herpetological Papers of Frank Wall (1868-1950) by Simon M. Campden-Main. 1969. 7 pages. Available from SHIS (see address above).

Physiological Systems in Semiarid Environments. Edited by C. Clayton Hoff and Marvin L. Riedesel. 1969. Available for $9.00 from: University of New Mexico Press, Albuquerque, New Mexico.

Venomous Reptiles by Sherman A. Minton, Jr. & Madge R. Minton. 1969. Available from Scribners & Sons for $7.95.

Les Salamandres d'Europe d'Asie et d'Afrique du Nord. (Encyclopédie Pratique du Naturliste XXXV) by Robert Thorn. 1969. 376 pages, 56 text figures, 11 maps and 16 plates. Available for $19.00 from: Editions Paul Lechevalier, 18, Rue des Ecoles, Paris - V^{e}, France.

Taxonomic Index to Andersson and Lonnberg Papers on Present Location of Linnaean Reptile and Amphibian Types by Paulo E. Vanzolini. 1969. 10 pages. Available from SHIS (see address above).

Herpetologica Mexicana by A. F. A. Weigmann. A facsimile reprint of this book has just been issued by the SSAR. The introduction by Edward H. Taylor gives details of Weigmann's types, type localities and field collectors. Eighty pages, folio; $3.00 to SSAR members from Dr. Seibert (see address above). Prices will be doubled shortly.

book review

EARLY FOUNDATIONS OF MEXICAN HERPETOLOGY. By Hobart M. Smith and Rozella B. Smith. University of Illinois Press. 1969. $6.50.

The father of Mexican herpetology, Alfredo Augusto Delsescautz Dugès, was born in Montpellier, France on April 16, 1826. He came to Mexico in 1853 and died on January 10, 1910. During his productive life as a gynecologist, professor of natural history and director of the natural history museum that he founded in the state college of Guanajuato he authored 184 publications, 94 of which pertain to herpetology. Most of his scientific studies were made during frustrating and unfavorable circumstances; but his industry, perseverance and judgement clearly establish his pertinent herpetological studies as central to an understanding of the early foundations of Mexican herpetology.

This attractive little book by Hobart and Rozella Smith is an annotated bibliography and index to the herpetological publications of Dugès. The authors have extensively utilized automation techniques in collating and assembling the bibliography. They have located rare and previously inaccessible publications. Two are reproduced in facsimile; they are "Fauna Del Estado De Guanajuato" and "Glándulas Salivares De Los Ofidianos." For each bibliographic entry there is a complete citation that is sure to be useful to students of Mexican amphibians and reptiles, but this book is more than a simple bibliography. It has considerable taxonomic importance.

All herpetological taxa created by Dugès are listed in an appendix with corresponding modern synonyms. Of 40 taxa erected by Dugès, 23 are considered as invalid. There is also an index to genus and species group names as they appeared in Dugès' publications with modern equivalents for relatively obscure applications.

This book should be of interest to anyone who has assumed the risk of improving one's knowledge of the amphibians and reptiles of Mexico.

J. P. KENNEDY, University of Texas Dental Branch, Texas Medical Center, Houston, Texas 77025.

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HERPETOLOGIST'S LEAGUE MEETS

The Herpetologist's League will again hold its annual meeting in conjunction with the AAAS meetings, 26-31 December 1969, in Boston, Massachusetts. A detailed outline and preliminary program of the meeting will appear in the September issue of Science. Details of paper sessions will be available only in the General Program prepared and sold by AAAS.

Herpetologist's League sessions will be held on 28-29 December only, with the possibility of some informal activity on 30 December. Lists of papers to be presented will be available only in the General Program sold by AAAS. Room assignments are tentatively set up for the Statler Hilton Hotel.

MEMBERS DESIDERATA

For sale - Books, Journals, & Reprints on herpetology. Includes Ditmars, Cornell Series, Herpetologica Volumes 1 & 6 to 13. Also some Copeia. Write to: Ralph Sinclair, 1197 Holz Avenue, Cincinnati, Ohio 45230.

news from institutions

NOTRE DAME HERPETOLOGY PROGRAM

At Notre Dame research in amphibian and reptile biology is particularly active; the approach is diverse yet integrated. Modern research facilities are available, including several programmable environmental chambers, recording and data processing equipment, apparatus for rearing and maintaining living animals, and extensive reprint collections. Much of the field work with these organisms is done in the Appalachians, and research is now being initiated on several of the species that are abundant at the University's Environmental Research Center in northern Wisconsin.

Current work includes studies on regeneration, oogenesis, development of tumors and the experimental transmission of cancer in frogs. Research on amphibian evolution and phylogeny, as based on comparative morphology and the fossil record, is currently centered on Miocene faunas of North America and the evolution of toads (Bufo). Similar studies on turtles have involved both paleontological and archeological materials. Several of the staff and students are involved in behavioral and ecological studies. These include a comparative demographic study of temperate and tropical plethodontid salamanders, behavioral aspects of inter- and intraspecific competition, locomotor behavior and photoperiodic responses of salamanders and lizards and studies on orientation and migration in amphibians and reptiles. An extra-optic photoreceptive site has been located in the brain of salamanders of the genus Plethodon which can mediate light-cued phase shifts of the circadian locomotor rhythm. Studies are now underway to determine the types of light cues used and the importance of these cues to other behavioral and physiological events.

Staff members having research interests in herpetology at Notre Dame are Drs. K. Adler, R. E. Gordon, J. A. Tihen and K. S. Tweedell.

OOOOO

CURRENT HERPETOLOGICAL TITLES, VII: 1968-69

by HERPETOLOGICAL INFORMATION SEARCH SYSTEMS

American Museum of Natural History
New York, N.Y. 10024

* * * *

To date the current list of titles has been no more than that. However, our files now contain some 18,000 titles of which more than 6,000 are current and have been published in Herpetol. Rev. (2-7). The cross index file to these titles is growing rapidly.

The name of the project has been changed to more clearly indicate its present emphasis. We anticipate computer access to the HISS data bank via taxonomic, geographic and subject routes next year.

This seventh list compiled by our staff (Dowling, Gilboa, Palser and Shaman) includes titles that have come to our attention during the period 26 April through 25 July 1969. It is published as a direct photo-offset reproduction from printout obtained from our IBM 2741 terminal. Some of the titles were punched on cards prior to the arrival of the terminal with upper and lower case capability and appear in this list in upper case.

The list is divided into two parts: titles published during 1968, and titles published during 1969. All these and future 1969 titles are available also on 3 x 5 library stock cards on a yearly subscription basis at 250 dollars a year per set or 600 dollars per 3 sets (for Author, Subject and Geography files). Abstracts are added to the titles when possible.

Acknowledgements: This list was prepared with the aid of the Herpetology Department and the Library of the Museum, and the Department of Zoology and the Computer Laboratory of the University of Rhode Island. We are especially grateful for the help of James E. Bradley and Harlan S. Mersey of the Computer Laboratory. Several colleagues have aided by bringing additional literature to our attention. Formost among these are James A. Peters, and George J. Jacobs. Richard G. Zweifel and Margaret S. Shaw, of the Department of Herpetology, have aided the project in many special ways. Robert J. Winter of the Department of Ichthyology has been very helpful with translations from Slavic journals. We are grateful for all of this help. This is contribution No. 14 of the Genera of Reptiles Project, which is supported by the National Science Foundation (NSF GN-707).

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1968 TITLES

--- A ---

ABERCROMBIE,M., JEAN BRACHET and THOMAS J.KING (Eds)
1968 Advances in morphogenesis, volume 7. Academic Press, New York. ix + 342 p., illus.

AGAPOVA,E.G. and B.P.TOKIN
1968 Is it possible to induce tumor growth in axolotls?
BIOL NAUKI 11(5):11-16.

ALBARET,J.L.
1968 Description de deux nouveaux nyctotheres parasites de Bufo regularis (Reuss) de Brazzaville
BULL MUS NAT HIST NATUR PARIS 40(4):814-822, 3 fig.

ALBARET,JEAN-LOUIS
1968 Parasicuophora mantellae n. gen. n. sp., cilie Plagiotomidae parasite de Mantella aurantiaca, batracien anoure de Madagascar
PROTISTOLOGICA 4(4):449-451, 3 fig.

AMARO,A., S.SENA and ELIAS DOS SANTOS
1968 Sobre alguns protozoarios enterozoicos de anfibios do Brasil. Nota previa
ATAS SOC BIOL RIO DE JANEIRO 12(3):123.

ANGELETTI,PIETRO U., RITA LEVI-MONTALCINI and PIETRO CALISSANO
1968 Nerve growth factor (NGF): chemical properties and metabolic effects
ADVAN ENZYMOL RELAT AREAS MOL BIOL 31:51-75.

ANGELETTI,R.A.HOGUE
1968 Studies on the nerve growth factor (NGF) from snake venom gel filtration patterns of crude venoms
J CHROMATOGR 36:535-537, 1 fig.

ANON
1968 BABY SEA TURTLES - WHAT GREATER ATTRACTION FOR TOURISTS?
WILDLIFE PROTECT SOC CEYLON NEWSLETT 26:4.

ANON
1968 Computer center speeds science data handling
REP RUTGERS 20(7):4, illus.

ANON
1968 OBSERVATIONS ON THE LEOPARD TORTOISE (TESTUDO PARDALIS BABCOCKI)
ANNU REP DEP NATUR CONSERV 24:144.

ANON
1968 Pilbara fauna observations
FAUNA BULL (WEST AUST) 2(3):19-20.

ANON
1968 SNAKE PARK
ANNU REP DEP NATUR CONSERV 24:58-59, ILLUS.

ANON
1968 SOME POST MORTEM OBSERVATIONS
ANNU REP DEP NATUR CONSERV 24:146-147.

ANON
1968 TWO NEW HONORARY LIFE MEMBERS
AFR WILDLIFE 22(4):319-320.

AOKI,KIYOSHI and SADAYUKI F.TAKAGI
1968 Intracellular recording of the olfactory cell activity
PROC JAP ACAD 44(8):856-858, 1 fig.

ARCAY DE PERAZA,LUCILA and CARLOS DIAZ MILA DE LA ROCA
1968 Los "Corpusculos paranucleares" en vertebrados poiquilotermos: II.-Descripcion de una nueva especie de Pirhemocyton en Iguana iguana de Venezuela, con discusion acerca de la naturaleza de este organismo y sus relaciones con otros parasitos afines
RES COMUN CONGR LATINOAMER ZOOL IV:1. (abstr)

ARCAY DE PERAZA,LUCILA, PIR NASIR and MARCOS TULIO DIAZ
1968 Los "Corpusculos paranucleares" en vertebrados poiquilotermos: I.-Descripcion de una nueva especie de Toddia en Iguana iguana de Venezuela
RES COMUN CONGR LATINOAMER ZOOL IV:6. (abstr)

ARCAY DE PERAZA,LUCILA and TRINA BASTARDO DE SAN JOSE
1968 Nuevos Coccidia de lagartos: Wenyonella ameivae sp. nov. y Eimeria subcylindrica sp. nov. (Coccidia, Eimeriidae), parasitos de Ameiva ameiva de Venezuela
RES COMUN CONGR LATINOAMER ZOOL IV:9. (abstr)

ASHBY,K.R.
1968 Observations on the ecology of a self-maintaining colony of the common frog Rana temporaria
J ECOL 56(3):26p. (abstr)

ASII,ZAPADNI
1968 Photo of Vipera ammodytes
VESMIR 47(5):160. (color)

--- B ---

B.,V.
1968 NIEUWE SLANGEN
BLIJDORP GELUIDEN 16(11):2-3, ILLUS.

BADEN,H.P. and P.F.A.MADERSON
1968 THE OCCURRENCE AND EVOLUTION OF FIBROUS PROTEINS IN THE AMNIOTE EPIDERMIS
AMER ZOOL 8:813. (ABSTR)

BAIN,O.
1968 Remarques au sujet d'une nouvelle filaire de cameleon malgache, proche de Foleyella brevicauda
BULL MUS NAT HIST NATUR PARIS 40(4):802-806, 2 fig.

BAIN,O. and J.BRUNHES
1968 Un nouveau genre de Filaire, parasite de grenouilles malgaches
BULL MUS NAT HIST NATUR PARIS 40(4):797-801, 2 fig.

BALDWIN,KENNETH V.
1968 THE DISTRIBUTION OF AMPHIBIANS AND REPTILES IN A PORTION OF NORTHEASTERN NEBRASKA
PROC S DAK ACAD SCI 47:122-126.

BALLS,M. and L.N.RUBEN
1968 Lymphoid tumors in Amphibia: a review
PROGR EXP TUMOR RES 10:238-260, 4 fig.

BARRIO,AVELINO
1968 El genero Batrachyla (Anura, Leptodactylidae), su status y sus vinculaciones con otros generos
RES COMUN CONGR LATINOAMER ZOOL IV:66. (abstr)

BARRIO,AVELINO
1968 Observaciones sobre aparato genital y reproduccion de Chthonerpeton indistinctum (Gymnophiona, Caecilidae)
RES COMUN CONGR LATINOAMER ZOOL IV:21. (abstr)

BARRIO,AVELINO
1968 Revision del genero Lepidobatrachus Budgett (Anura, Ceratophrynidae)
RES COMUN CONGR LATINOAMER ZOOL IV:64. (abstr)

BARYSHNIKOV,I.I., L.M.BLAGOVIDOVA and G.I.MILSHTEIN
1968 On the pharmacology of dithran
FARMAKOL TOKSIKOL 31(4):434-436. (Russ)

BASTARDO DE SAN JOSE,TRINA
1968 Descripcion y ciclo evolutivo de dos nuevos Coccidia de Tropidurus torquatus de Venezuela : Wenyonella arcayae sp. nov. y Eimeria torquati sp. nov. (Coccidia, Eimeriidae)
RES COMUN CONGR LATINOAMER ZOOL IV:10. (abstr)

BEETSCHEN,J.-C., A.-M.DUPRAT and J.-P.ZALTA
1968 Effets de quelques inhibiteurs des syntheses de RNA et de proteines sur la differenciation in vitro de cellules embryonnaires d'amphibiens
EXCERPTA MED INT CONGR SER 166:37-38. (abstr)

BELLAIRS,A.D'A. and SUSAN V.BRYANT
1968 Effects of amputation of limbs and digits of lacertid lizards
ANAT REC 161(4):489-496, 5 fig.

BEREZHINSKAYA,V.V., E.E.ALESHINSKAYA and E.A.TRUTNEVA
1968 Anticholinesterase activity of several alkaloids of the isoquinoline series
FARMAKOL TOKSIKOL 31(3):296-299. (Russ)

BERGOUNIOUX,F.M. and F.CROUZEL
1968 Deux tortues fossiles d'Afrique
BULL SOC HIST NATUR TOULOUSE 104(1-2):179-186, 3 fig.

BERGER,LESZEK
1968 The effect of inhibitory agents in the development of green-frog tadpoles
ZOOL POL 18(3):381-390, 3 fig., 3 tab.

BERNARD,CLAUDE, YVES-MICHEL GARGOUIL, OGER ROUGIER, GUY RAYMOND and DIDIER GARNIER
1968 La reponse et les courants transmembranaires de la fibre auriculaire cardiaque d'axolotl; existence d'un canal rapide insensible a la tetrodotoxine, presence d'un canal lent
J PHYSIOL (PARIS) 60(suppl 2):346.

BERRY,P.Y. and G.VARUGHESE
1968 Reproductive variation in the torrent frog Amolops larutensis (Boulenger)
J LINN SOC LONDON ZOOL 47(313):547-559, 7 fig., 5 tab., 2 pl.

BLACKLER,A.W. AND M.FISCHBERG
1968 HYBRIDIZATION OF XENOPUS LAEVIS PETERSI (POWERI) AND X.L. LAEVIS
REV SUISSE ZOOL 75(52):1023-1032, 8 FIG.

BLACKLER,ANTONIE W.
1968 NEW CASES OF THE OXFORD NUCLEAR MARKER IN THE SOUTH AFRICAN CLAWED TOAD
REV SUISSE ZOOL 75:506-509.

BLAIR,FRANK
1968 Evolucion del genero Bufo en Sur America
RES COMUN CONGR LATINOAMER ZOOL IV:71. (abstr)

BLAIR,W.FRANK
1968 Amphibians and reptiles, p. 289-310, 3 fig., IN Thomas A. Sebeok (Ed), Animal communication: techniques of study and results of research. Indiana Univ. Press, Bloomington.

BOGART,JAMES P.
1968 Los cromosomas de anfibios anuros del genero Eleuterodactylus [sic]
RES COMUN CONGR LATINOAMER ZOOL IV:73. (abstr)

BONS,JACQUES
1968 Addition a la faune du Maroc: Acanthodactylus savignyi savignyi Aud. (Sauria, Lacertidae)
BULL SOC SCI NATUR PHYS MAROC 47(3-4):387-394, 3 fig.

BOURKE,D.O'D
1968 A toad trap
NIGERIAN FIELD 33(3):143.

BOURGAT,ROBERT
1968 Accouplement du Chamaeleo pardalis Cuvier de l'ile de la reunion
REV COMPORTEMENT ANIM 2(4):78-81, 3 fig.

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1968 Behaviour of the female of Chamaeleo pardalis Cuvier, 1829 after copulation
BULL SOC ZOOL FR 93(3):355-356. (Fr)

BOURGAT,ROBERT
1968 Etude des variations annuelles de la densite de population de Chamaeleo pardalis Cuv., 1892, dans son biotope de l'ile de la reunion
VIE MILIEU 19(1):227-231, 2 fig., 1 tab.

BOVEN,J.K.A.VAN
1968 Allometrie bij de metamorfose van Rana temporaria Linnaeus (Amphibia: Ranidae)
PUBL NATUURHIST GENOOT LIMBURG 18(3-4):5-15, 8 fig., 3 tab.

BRIEGLEB,W.
1968 Simulated weightlessness for the ontogenesis of the otolith organ
NATURWISSENSCHAFTEN 55(8):397.

BRISBOIS,L., N.RABINOVITCH-MAHLER, P.DELORI and L.GILLO
1968 Naja naja atra venom fractions obtained by chromatography on sulfoethyl-Sephadex
J CHROMATOGR 37(3-4):463-475. (Fr)

BROADLEY,DONALD G.
1968 A REVISION OF ASPIDELAPS SCUTATUS (A. SMITH) (SERPENTES : ELAPINAE)
ARNOLDIA 4(2):1-9, 3 FIG., 2 TAB.

BROWN,A.M. and R.K.ORKAND
1968 A down then up staircase in frog ventricle due to altered excitation-contraction coupling
J PHYSIOL (LONDON) 2197(2):295-304, 6 fig.

BRUECK,GUSTAV
1968 Zur herpetofauna Afghanistans
VESTN CESK SPOLECNOSTI ZOOL 32(3):201-208.

BRUECK,GUSTAV
1968 Svlekani a metabolismus uzovky hladke (Coronella austriaca) v zajeti
ZIVA 16(5):188.

BRUM-ZORRILLA,NADIR
1968 Los cromosomas somaticos de la hembra de Bufo arenarum
RES COMUN CONGR LATINOAMER ZOOL IV:77. (abstr)

BRUM-ZORRILLA,NADIR and FRANCISCO SAEZ
1968 Los cromosomas de varias especies de la familia Hylidae (anfibios, anuros)
RES COMUN CONGR LATINOAMER ZOOL IV:62. (abstr)

BRYGOO,E.R. and CH.A.DOMERGUE
1968 Description d'un nouveau Brookesia de Madagascar: B. vadoni n. sp. (Chamaeleonides)
BULL MUS NAT HIST NATUR PARIS 40(4):677-682, 4 fig., 1 tab.

BUHLER,GARY A.
1968 Development of the larval stages of Ophiotaenia gracilis, a cestode parasite of bullfrogs
J COLO-WYO ACAD SCI 6(1):59. (abstr)

BURDA,FRANTISEK
1968 K vyskytu mloka obecneho v Beskydech
ZIVA 16(3):105-106, 1 fig.

BURLET,A.
1968 LES PHOSPHATASES ACIDES DU SYSTEME HYPOTHALAMO-NEUROHYPOPHYSAIRE DE RANA ESCULENTA: VARIATIONS CYCLIQUES ET EXPERIMENTALES
C R ASS ANAT BULL ASS ANAT NANCY (141):617-624.

BUSSE,KLAUS
1968 Desarrollo de Batrachyla leptopus Bell (Anura, Salientia) con notas sobre su ecologia y comportamiento
RES COMUN CONGR LATINOAMER ZOOL IV:no paganation.

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CAIRNCROSS,B.L.
1968 SOUTH AFRICAN TORTOISES
AFR WILDLIFE 22(4):344.

CAMPANTICO,EZIO, MARIANNA OLIVERO and ALBERTO PEYROT
1968 Accrescimento corporeo e metabolismo dello iodio in larve di Bufo bufo trattate con prolattina: studio con ^{125}I
RIC SCI 38(10):980-985, 1 fig., 3 tab.

CANDIA,OSCAR A., JOSE A.ZADUNAISKY and FRANCISCO BAJANDAS
1968 Electrical potential profile of the isolated frog cornea
INVEST OPHTHALMOL 7(4):405-415, 6 fig., 2 tab.

CARLISKY,N.J.
1968 Estudios sobre el papel de la arginasa renal en el transporte activo de urea
RES COMUN CONGR LATINOAMER ZOOL IV:29. (abstr)

CARLISKY,N.J., A.BARRIO and V.BOTBOL
1968 La influencia del agua y Na del ambiente en la eleccion del mecanismo de excrecion de urea en anfibios
RES COMUN CONGR LATINOAMER ZOOL IV:27. (abstr)

CARLISKY,N.J., A.BARRIO and V.BOTBOL
1968 Reabsorcion renal de urea en anuros terrestres y totalmente acuaticos
RES COMUN CONGR LATINOAMER ZOOL IV:26. (abstr)

CARLISKY,N.J., A.BARRIO and I.L.SANDNIK
1968 Sisntesis y excrecion de urea en anfibios apodos
RES COMUN CONGR LATINOAMER ZOOL IV:28. (abstr)

CARR,ARCHIE
1968 Sea turtles: a vanishing asset
IUCN PUBL (N.S.) 13:162-168.

CASTON,J. and A.GRIBENSKI
1968 Recherches sur les reactions rotatoires et compensatrices d'origine vestibulaire chez la grenouille
J PHYSIOL (PARIS) 60(suppl 2):354. (abstr)

CHARVAT,ZD. AND B.KRAL
1968 DIE MORPHOLOGIE DER WACHSTUMSKOLBEN DER AXONE IM REGENERIERENDEN RUECKENMARK DES SCHWANZES DER WALDEIDECHSE (LACERTA VIVIPARA JACQUIN)
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* * * *

ABOOD,LEO G. (SEE SNIDSR968SNT: 1)
ACEVES,J. (SEE ERLID 969STA: 163)
ALBRIGHT,JOHN T. (SEE MICHJE969UOD: 316)
ALCALA,ANGEL C. (SEE CROOPG968EPL: 323)
ALFAU,CARMEN DE (SEE JAKOS 969MPO: 306)
ALLEN,JOHN M. (SEE VISELP969AAA:1463)
ANDREOLETTI,G.E. (SEE FASOA 968HAA:1177)
ASHGAR,S.S. (SEE DEVIA 968NAS: 943)
BACHARACH,A.D.E. (SEE HALLMO969IVP: 303)
BADANO,B.N. (SEE VIDAJC968IET: 913)
BAGNARA,JOSEPH T. (SEE HADLME969INC: 69)
BAILEY,GEORGE S. (SEE NAKAM 969PPP: 681)
BAIRD,CHRISTINE E. (SEE ABE K 969AMC: 362)
BALDWIN,ROGER (SEE MCCLL 969RWU: 381)
BAPTISTA,LUIS (SEE GORMGC969CSR: 6)
BARRIO,A. (SEE CARLNJ968ASP: 679)
BEALL,R.J. (SEE PRIVCA968TIR: 33)
BEAUMONT,ANDRE (SEE REGAE 968ATL:1983)
BECAK,MARIA LUIZA (SEE BECAW 968ATH:1162)
BEETSCHEN,JEAN-CLAUDE (SEE DUPRAM968ECC:1872)
BEIDLER,LLOYD M. (SEE BARGFG969LRA: 242)
BELLEC,ANNIE (SEE STOLJ 968ADE:1308)
BELLIS,EDWARD D. (SEE BARTGT969HND: 148)
BERGERHOFF,K. (SEE LEISKH969HID: 105)
BERGER,RONALD O. (SEE COMIDE969GPA: 319)
BERTINI,F. (SEE PIEZRS969DGA: 244)
BEZRUCHKO,S.M. (SEE KUL AS968DRP:1257)
BLACKBURN,GLENN K. (SEE MACKTN969PVA: 266)
BLAIR,W.F. (SEE BOGAJP969CCV: 30)
BLASINI DE AUSTIN,SHEILA (SEE HEATH 969DEW: 245)
BLASINI DE AUSTIN,SHEILA (SEE HEATH 968HTT: 807)
BOGDANOV,O.P. (SEE ATAEC 968FAS:1420)
BONHOMME,CH. (SEE POURR 968TAU: 255)
BORRERO,LUIS M. (SEE ALJUEF968IML: 241)
BOQUET,P. (SEE MEAUJ 968AVN: 929)
BOTBOL,VIOLETA (SEE CARLNJ968ASP: 679)
BOTHNER,RICHARD C. (SEE VAN TM969CSA: 107)
BOULOS,R. (SEE HUSSMF968SHD: 29)
BOVERIS,A. (SEE VIDAJC968IET: 913)
BOYSE,EDWARD A. (SEE CAMEPE968SSP: 392)
BRODIE,EDMUND,JR. (SEE ALTIR 968ACF: 241)
BROTHERS,NANCY (SEE MORLH 968AAR:1222)
BRUECKNER,G. (SEE STERG 969EMI: 74)
BUCHANAN,HILAIRE (SEE NYE ER969ATR: 483)
BURLEY,F.WILLIAM (SEE SMITHM968NAA: 147)
BURNSTOCK,G. (SEE KIRBS 969PSC: 321)
BURNSTOCK,G. (SEE KIRBS 969CPS: 307)
BURNLEY,JOHN M. (SEE SCHLFC968ALS: 74)
BURY,R.BRUCE (SEE GORMGC969CSR: 6)
BUTCHER,REGINALD W. (SEE ABE K 969AMC: 362)
BUTCHER,R.W. (SEE ABE K 969MLA: 21)
BYRD,WILLIAM W. (SEE JORDOR968SOR: 335)
CALVENTI,IDELISA BONNELLY DE (SEE JAKOS 969MPO: 306)
CAMPBELL,HOWARD W. (SEE HARTPH969AVR:1221)
CARL,GARY (SEE BANTBH9680EG: 263)
CARR,ARCHIE (SEE WITHR 969RTP: 49)
CAUTHEN,NELSON R. (SEE WAGNMK968CRI: 225)
CHALUMEAU-LE FOULGOC,MARIE-THERESE (SEE AIMAC 969AEP: 368)
CHANG,C.C. (SEE LEE CY968PPC:1009)
CHAPPELL,L.CARLTON (SEE HINETC968ARF: 1)
CHAUVET,J. (SEE ACHER 969ENH: 759)
CHAUVET,M.T. (SEE ACHER 969ENH: 759)
CHAVIN,W. (SEE CHENYM968ITA: 31)
CHIU,T.H. (SEE TSENLF968ADI: 526)
CHIU,T.H. (SEE LEE CY968PPC:1009)
CIVAN,MORTIMER M. (SEE DIBODR969AST: 1)
COOKE,D. (SEE HARRP 969MFI: 184)
COOPER,MARTHA R. (SEE COOPJE968SGG: 19)
CORSIN,J. (SEE DEVIC 9680DC: 413)
COX,RONALD (SEE CARTWA968ARK: 66)
CRABBE,J. (SEE DE WP 968RNA: 280)
CSOBALY,S. (SEE KAPAE 968IVE: 498)
DANIELYAN,F.D. (SEE DAREIS968DTP: 65)
DANIEL,P.J. (SEE ROWEDT968TD : 53)
DARLINGTON,R.W. (SEE GRAVM 968PHF: 467)
DAS,ASIT B. (SEE KRISRV968CPS: 221)
DAVIES,H.G. (SEE TOOZJ 968LEM: 521)
DAVIS,W.K. (SEE CAMPPM968VSB: 327)
DEHLINGER,PETER J. (SEE MILLLK969NFL: 915)
DE JONGH,H.J. (SEE GANSC 969BRC:1223)
DELORI,P. (SEE BRISL 968EFO: 463)
DU PRE,FRANK (SEE MARSG 969MFS: 14)
DUFAURE,J.P. (SEE HUBEJ 968NSD: 135)

DYER,ROBERT F. (SEE COWDRR968APC:1293)
EBNER,F.F. (SEE HALLWC969TPT: 193)
ECALLE,R. (SEE GAYRP 968AUF: 33)
ECK,RICHARD V. (SEE DAYHMO968APS: 1)
ECKER,R.E. (SEE SMITLD969RON: 281)
EDELMAN,I.S. (SEE LIPTP 969ERH: 164)
EDMAN,K.A.P. (SEE CLEWD 969LDS: 296)
EGAR,MARGARET (SEE HUGHAF969DNF: 579)
EGAR,MARGARET (SEE HUGHA 969SCA: 201)
EISENBERG,ROBERT S. (SEE GAGEPW969APA: 298)
EISENBERG,ROBERT S. (SEE GAGEPW969CST: 265)
ELIAZAN,M. (SEE LATIM 968PSI: 735)
ERLIJ,DAVID (SEE LEBLG 969EEA: 149)
FARBER,J. (SEE GANSC 969BRC:1223)
FARINA,REINALDO (SEE VITAO 968CRE: 993)
FAVORITE,F.G. (SEE BROWAH968LSS: 1)
FERGUSON,DENZEL E. (SEE JORDOR968SOR: 335)
FISHER,JAMES R. (SEE MA PF968MAD: 105)
FISHER,JAMES R. (SEE MA PF968MAD: 687)
FOGARTY,MICHAEL J. (SEE HINETC968ARF: 1)
FORTE,G.M. (SEE FORTJG969PDI: 267)
FRANCESCHI,JULIA PRADO (SEE VITAO 968T : 973)
FRITZ,O.G.,JR. (SEE SWIFTJ969PSS: 54)
FRITTS,THOMAS H. (SEE SMITHM968NAA: 147)
FRY,D.J. (SEE DICKDA968ADS: 589)
GAGE,PETER W. (SEE EISERS969ICS: 279)
GARGIULO,GIULIANA (SEE MOREA 968ARC: 117)
GAZARJAN,K.G. (SEE KUL AS968DRP:1257)
GEBHAROT,BRYAN M. (SEE COWDRR968APC:1293)
GEERING,GAYLA (SEE CAMEPE968SSP: 392)
GENNARO,J.,JR. (SEE MESZR 969CCU: 263)
GENNARO,JOSEPH F.,JR. (SEE MESZRM969CUF: 229)
GFELLER,EDUARD (SEE RAFFNS969DNL: 246)
GILBOA,ITZCHAK (SEE DOWLHG969CHT: 7)
GILLO,L. (SEE WIRTC 968EE : 937)
GILLO,L. (SEE BRISL 968EFO: 463)
GLENN,JANICE S. (SEE BENNTP969TSO: 412)
GONZALEZ,D. (SEE SHIMT 969LAC: 325)
GOODMAN,DONALD C. (SEE SENND 969CCP: 324)
GORBMAN,AUBREY (SEE OSHIK 969PIU: 195)
GORIS,RICHARD C. (SEE TERASI968GPC: 682)
GORMAN,GEORGE C. (SEE NAKAM 969PPP: 681)
GRANOFF,ALLAN (SEE GRAVM 968PHF: 467)
GREENE,HARRY W. (SEE TURNEH968NEL: 162)
GROSS,PAUL R. (SEE LANDR 969IRP: 571)
GROSSO,A. (SEE FASOA 968HAA:1177)
GUROVIC,LJ. (SEE GAMUS 968HDP: 102)
GUSELNIKOVA,K.G. (SEE VOROGS968PIO: 909)
HANAHAN,DONALD J. (SEE WELLMA969ICT: 414)
HANKE,W. (SEE LEISKH969HID: 105)
HARDMAN,H.F. (SEE DAGERC968HRS: 137)
HARRIS,J.B. (SEE SANAL 969OCS: 266)
HEATWOLE,AUDRY (SEE HEATH 969DEW: 245)
HEMMER,H. (SEE FLINR 968SMA: 155)
HERRERO,RITA (SEE HEATH 968HTT: 807)
HESS,HELEN H. (SEE LOLLRN969RRO: 9)
HIBBITTS,TERRY (SEE TREARW969TDF: 281)
HOGE,A.R. (SEE LATIM 968PSI: 735)
HOLEMANS,K.C. (SEE MEIJHS969IIB: 174)
HOMBACH,ARTHUR (SEE GOSSRL968BTC: 177)
HOPPE,JOANN (SEE JOHNBD968CVR: 107)
HOPP,WILLIAM B. (SEE GEYERE969NFT: 34)
HOREL,JAMES A. (SEE KEATEG969BES: 309)
HOUDAYER,M. (SEE FOUGM 968IRI: 968)
HSU,BENNY C.C. (SEE CALDDK969SRS: 4)
HU,C.Y. (SEE CHANQL968EMW: 79)
HUBBS,C. (SEE BOGAJP969CCV: 30)
HUHEEY,JAMES E. (SEE BRANRA968FOR: 177)
HUNSAKER,D.,II (SEE JACKL 969CGS: 40)
HUNT,S.V. (SEE SIMPTH968SBI: 519)
HUTCHISON,M.D. (SEE THOMMP968REE: 427)
ILLIES,J. (ED) (SEE FITTEJ968BES: 1)
INGER,ROBERT F. (SEE LLOYM 968DRA: 497)
IZARD,Y. (SEE MEAUJ 968AVN: 929)
JACOBSON,A.G. (SEE BURNMB969AMM: 537)
JACOBSON,ELLIOTT R. (SEE PRIEAA968NLM: 339)
JACOB,R. (SEE ANTOH 969MRF: 33)
JAEGER,R. (SEE FLINR 968SMA: 155)
JOHNSTON,M.R.L. (SEE STEHWE968CBS:1151)
JONES,D.R. (SEE SHELG 968CSC: 631)
JONGKIND,J.F. (SEE QUAYWB968IFH: 11)
JOUANNET,M. (SEE MEAUJ 968AVN: 929)
KAISER,E. (SEE RAABW 968NAS:1017)
KAPPERS,J.ARIEENS (SEE QUAYWB968IFH: 11)
KARP,V.K. (SEE TRINFF968RBS: 37)
KARZON,D.T. (SEE CLARHF968TOM: 270)
KAS'IAN,I.I. (SEE PARIVV968MSW: 1)
KATSUKI,Y. (SEE TERASI968GPC: 682)
KAUFMANN,R. (SEE ANTOH 969MRF: 33)
KELENYI,G. (SEE NEMEA 968CLE: 501)
KELLY,DOUGLAS E. (SEE TONOA 969EMS: 275)
KENNEDY,D.T. (SEE SHIMT 969LAC: 325)
KEZER,JAMES (SEE SETOT 969CSM: 407)
KIEFFER,JULIO (SEE GOMEM 968PPI: 921)
KIMMEL,JAMES R. (SEE GEHLFR969PTS: 300)
KING,ARTHUR C. (SEE HIRTHF968BDS: 333)
KING,F.WAYNE (SEE LLOYM 968DRA: 497)
KIRCHNER,JOHN H. (SEE HOGARA968IEV: 167)
KISPOEV,K.A. (SEE CHUGYD968DRO:1829)
KITAI,S.T. (SEE SHIMT 969LAC: 325)
KLIMSTRA,W.D. (SEE THOMMP968REE: 427)
KLINGE,H. (ED) (SEE FITTEJ968BES: 1)
KMIOTEK,E.H. (SEE SALLHJ968CPS: 213)
KOH,K.H. (SEE LEVEHH968TVS:XXII)
KOKETSU,K. (SEE NISHS 968ASI: 717)
KOMAROMY,L. (SEE MONTT 968SDA: 501)
KOMATSU,Y. (SEE HOSHT 968SPI: 508)
KORMANN,LEO A. (SEE KEATEG969BES: 309)

KOSTELLOW,A.B. (SEE MORRGA969MAE: 186)
KOTARBA,IRENEUSZ (SEE CELLM 968BES: 345)
KOWALSKI,KAZIMIERZ (SEE BOCHZ 968CHF: 59)
KRAKAUER,THOMAS (SEE GANSC 968WLS: 747)
KRIEGSTEIN,HENRY (SEE BENNTP969TSO: 412)
KUMAR,SANTOSH (SEE BHATSP969CSA: 295)
LANDE,M.A. (SEE ZADUJA969CTA: 228)
LANGLADA,F.G.DE (SEE BECAW 968ATH:1162)
LANGDON,ROBERT G. (SEE STRABS969TCA: 277)
LANTOS,T. (SEE KAPAE 968IVE: 498)
LEAF,ALEXANDER (SEE DIBODR969AST: 1)
LEE,C.Y. (SEE TSENLF968ADI: 526)
LEE,DAVID S. (SEE KNIGEL968USF: 86)
LEE,S.Y. (SEE LEE CY968PPC:1009)
LEONARD,DONALD (SEE RUFFDG968CAR: 312)
LEONG,L.T. (SEE LEVEHH968TVS:XXII)
LICHT,P. (SEE MADEPF968FIR:1083)
LIDDLE,GRANT W. (SEE ABE K 969AMC: 362)
LIDDLE,G.W. (SEE ABE K 969MLA: 21)
LIDDLE,RODGER A. (SEE ABE K 969AMC: 362)
LIMLOMWONGSE,L. (SEE FORTJG969PDI: 267)
LIMPUS,COLIN (SEE BUSTHR969OFT: 29)
LO,T.B. (SEE CHANQL968EMW: 79)
LO,T.B. (SEE CHENYH968PN : 84)
LOEFFLER,CLARENCE A. (SEE HAGLB 969WDW: 69)
LOOMIS,RICHARD B. (SEE LUCAJL968GHA: 233)
LOWE,CHARLES H. (SEE COLECJ968KLS: 128)
LOWERY,JAMES (SEE JOHNCR968OBB: 336)
MACKRELL,T. (SEE MESZR 969CCU: 263)
MACKRELL,T.N. (SEE PACIAD969RPE: 536)
MAKHLOUF,G.M. (SEE SHOERL969IPI: 263)
MANDELL,M.L. (SEE COOPEL969BMT: 172)
MANHOURI,H. (SEE LATIM 968AP : 893)
MCCAIN,GARVIN (SEE CHU PK969DLE: 14)
MCCOLLOUGH,NEWTON C. (SEE GENNJG968FOC: 855)
MCREYNOLDS,J.S. (SEE OTTOD 969SIF: 24)
MELLO,R.FRANCO DE (SEE BELLHE968ECP: 761)
MICHL,H. (SEE BACHH 968TTM: 903)
MICHEL,ODILE (SEE STOLJ 968ADE:1308)
MIMS,MARTHA F. (SEE MCKIRG969LAM: 30)
MIRANDA,MICHELE (SEE PETRD 968AOR: 574)
MIRANDA,MICHELE (SEE PETRD 968OAA: 564)
MIRANDA,MARTA E. (SEE BARRA 968DPB: 887)
MIRANDA,MARTA E. (SEE BARRA 968ECM: 869)
MITRA,J. (SEE FISCHK968MMS: 194)
MIZELL,MERLE (SEE STACCW968EMO: 63)
MLYNARSKI,MARIAN (SEE BOCHZ 968CHF: 59)
MOORE,D.R. (SEE OESTHL968CPB: 1)
MOORE,ROBERT E. (SEE MUELCF969GSL: 35)
MOORE,ROBERT G. (SEE MCGISM969TBC: 38)
MORAFKA,DAVID J. (SEE BANTBH968ACL: 161)
MOZELL,MAXWELL M. (SEE O CORJ969QSF: 51)
MURRAY,R.M. (SEE ROWEDT968TD : 53)
NARANSCIK,P. (SEE GAMUS 968HOP: 102)
NELSON,C.V. (SEE GASTPR968MMD: 289)
NICHOLSON,CHARLES (SEE LLINR 969PCC: 184)
NICHOLSON,WENDELL E. (SEE ABE K 969AMC: 362)
NICHOLSON,W.E. (SEE ABE K 969MLA: 21)
NIRENBERG,MARSHALL (SEE MARSR 969RCR: 1)
OLD,LLOYD J. (SEE CAMEPE968SSP: 392)
OLIVEIRA,VILSON ANTONIO DE (SEE VITAO 968CRE: 993)
OREJAS MIRANDA,BRAULIO R. (SEE FREIMA968NLF: 145)
ORR,LOWELL P. (SEE MAPLWT968OAS: 179)
ORTLEB,EDWARD P. (SEE RANDAS969DDC: 46)
OTT,J. (SEE HEUSH 968WPS:1005)
OWSLEY,P.A. (SEE DELLHD969LEF: 325)
OZETI,NECLA (SEE WAKEDB969ERF: 124)
OZMENT,JAMES E. (SEE SKORAC968HHV: 247)
PAGANELLI,CHARLES V. (SEE GANSC 968WLS: 747)
PALSER,IRENE (SEE DOWLHG969CHT: 7)
PATNAIK,B.K. (SEE MOHAMK968EAA:1129)
PAYNE,JOHN E. (SEE KAPLHM968LDF: 153)
PEHLEMANN,F.-W. (SEE LEISKH969HID: 105)
PENHA,A.M. (SEE BELLHE968ECP: 761)
PICKETT,JOHN (SEE MALEG 968SAA: 179)
POLLACK,GERALD (SEE MERRRW969ESA: 1)
POMERAT,CHARLES M. (SEE SETOT 969CSM: 407)
PORTNYAGINA,V.A. (SEE TRINFF968RBS: 37)
PRECHT,WOLFGANG (SEE LLINR 969PCC: 184)
PRIVITERA,C.A. (SEE KANEJF968EAA: 83)
PUPPI,A. (SEE MONTT 968SDA: 501)
QUIGLEY,DIANE (SEE LICHJR968PNG:1092)
RABINOVITCH-MAHLER,N. (SEE BRISL 968EFO: 463)
RABODOMIHAMINA,L. (SEE VUILS 968OSP: 25)
RAMAIAH,T.R. (SEE GANGNS968EHO: 218)
RAPPAPORT,B.N. (SEE RAPPR 968ACC: 187)
RASKOVA,H. (SEE MASEK 968ASA:1011)
RATHJEN,WARREN F. (SEE CALDDK969SRS: 4)
RAUDONAT,H.W. (SEE MEBSD 968BIH: 907)
REED,LOUIS A. (SEE MCKIRG969LAM: 30)
REHM,W.S. (SEE PACIAD969RPE: 536)
REHM,W.S. (SEE NOYEDH969WBI: 264)
REID,H.A. (SEE GHITJ 968ASV:1243)
REYNIERSE,JAMES H. (SEE GLEAKK969BSP: 58)
RICHARDSON,ANN M. (SEE KREKCO968TML: 429)
RIORDAN,D.F. (SEE HARRP 969MFI: 184)
RISS,WALTER (SEE JAKWJS969RPT: 203)
RIZZO,E.DE (SEE URIEJ 968CEV: 938)
ROBISON,G.A. (SEE ABE K 969MLA: 21)
ROCKEL,EDWARD G. (SEE CRANWJ968MAT: 332)
ROGERS,A.W. (SEE DICKDA968ADS: 589)
ROGERS,RALPH (SEE JOHNBD968CVR: 107)
ROSENBERG,ALBERT JEAN (SEE GOSWMN968ECT:2224)
ROUNDS,DONALD E. (SEE SETOT 968CTL: 75)
RUSSELL,J. (SEE GOODJ 968IET: 749)
RUTKOWIAK,BOHDAN (SEE GORNH 968VCC: 433)
RUTTER,WILLIAM J. (SEE LEBHHG969DFD: 109)
RYABUKHA,T.K. (SEE TRINFF968RBS: 37)

SABATH,LAURA ELSA (SEE SABAMD969MIG: 148)
SACHS,G. (SEE SHOERL969IPI: 263)
SANDERS,S.S. (SEE PACIAD969RPE: 536)
SANTOLAYA,R.C. (SEE PIEZRS969DGA: 244)
SARKAR,N.K. (SEE DEVIA 968NAS: 943)
SCHACHER,JOHN F. (SEE SULAA 969SBS: 104)
SCHLAUCH,FREDERICK C. (SEE LATHR 969NWS: 1)
SCHMIDT-NIELSEN,KNUT (SEE PRANHD969EWL: 973)
SCHRAM,A. (SEE VAN P 968UCU: 375)
SCHRECK,CARL B. (SEE JOHNCR969FFL: 280)
SCHREIBER,G. (SEE BELLHE968ECP: 761)
SCHWABE,G.H. (ED) (SEE FITTEJ968BES: 1)
SHAFFER,LAWRENCE (SEE MORLH 968AAR:1222)
SHAMMAKOV,S. (SEE ATAEC 968FAS:1420)
SHAW,J.J. (SEE LAINR 969NHL: 159)
SHAW,MARGERY W. (SEE PENNLA969MYC: 9)
SHEPHERD,G.M. (SEE OTTOD 969SIF: 24)
SHMANTSAR,I.A. (SEE RUMYPP968SPR:1234)
SIMMONS,ROBERT S. (SEE HARRHS968AGS: 79)
SINGH,I.P. (SEE KAURYK968PSS:1174)
SIOLI,H. (ED) (SEE FITTEJ968BES: 1)
SMITH,HOBART M. (SEE WILLKL968NLG: 163)
SMITH,HOBART M. (SEE CHACGE968TAE: 165)
SMITH,MICHAEL H. (SEE GIBBJW968EOT: 331)
SNIDER,RAY S. (SEE SNIDSR968SNT: 1)
SOH,N.M. (SEE LEVEHH968TVS:XXII)
SPANGLER,S.G. (SEE PACIAD969RPE: 536)
STAHNKE,H.L. (SEE JOHNBD968CVR: 107)
STENSAAS,SUZANNE S. (SEE STENLJ968LMG: 315)
STOPPANI,A.O.M. (SEE VIDAJC968IET: 913)
SUTTON,DALLAS A. (SEE HOUSHL969MKD: 184)
SVERDLOV,S.M. (SEE GALAAG968AIR:1395)
SWENNEN,C. (SEE SPAAAL968VV : 1)
SZYMCZAKOWSKI,WACLAW (SEE BOCHZ 968CHF: 59)
TANNER,WILMER W. (SEE BANTBH968RSB: 183)
TASSAVA,ROY A. (SEE CONNTG968LRS: 365)
TAYLOR,EDWARD H. (SEE DRYDGL969RFM: 269)
TAYLOR,R.JOHN (SEE BENNC 968NLS: 455)
TEMPLE,DOMINIQUE (SEE SENTP 969RNS: 540)
THOMPSON,JAMES C. (SEE DAVIWD969CEH: 204)
THOMAS,RICHARD (SEE SCHWA 969RAA: 51)
THOMAS,S. (SEE HORNR 969EPS: 321)
THORNTON,CHARLES S. (SEE CONNTG968LRS: 365)
TIGYI,A. (SEE MONTT 968SDA: 501)
TINKLE,D.W. (SEE PENNLA969MYC: 9)
TOGNETTI,KEITH P. (SEE BUSTHR969GST: 939)
TORRES,FRANK (SEE HEATH 969DEW: 245)
TRANDABURU,VIORICA (SEE TRANT 968REP: 284)
TREMOR,J.W. (SEE YOUNRS968WDF: 87)
TSENG,T.C. (SEE LEE CY968PPC:1009)
TURCHINI,J.P. (SEE POURR 968TAU: 255)
TURNER,TOM (SEE HUGHAF969DNF: 579)
TYLER,MICHAEL J. (SEE WOODDS968AFF: 705)
URSO,P. (SEE GRILRS968AEC: 208)
URUSHIBARA,OSAMU (SEE DAVIWD969CEH: 204)
VANCEA,STEFAN (SEE STUGB 968GVY: 97)
VANCE,VELMA J. (SEE MURRDE968PRT: 329)
VANCE,VELMA J. (SEE KREKCO968TML: 429)
VARUGHESE,G. (SEE BERRPY968RVT: 547)
VAUGHAN,P. (SEE PROSU 968HEI: 495)
VIGH,B. (SEE TEICI 968HEM: 505)
VITAL BRAZIL,OSWALDO (SEE HADLWA968N :1001)
VITAL BRAZIL,OSWALDO (SEE GOMEM 968PPI: 921)
VOLPE,E.PETER (SEE COWDRR968APC:1293)
WAISBICH,EZEQUIEL (SEE VITAO 968T : 973)
WAKE,DAVID B. (SEE OZETN 969MET: 91)
WEAVER,LINDA J. (SEE FRIEB 969CFL: 39)
WEEMS,WILLIAM A. (SEE GEHLFR969PTS: 300)
WILLIAMS,THEODORE P. (SEE BARGFG969LRA: 242)
WILSON,ALLAN C. (SEE NAKAM 969PPP: 681)
WOOLFITT,ROBERT A. (SEE REYERW969LRI: 249)
WRIGHT,R.S. (SEE SIMPTH968SBI: 519)
YOSHIDA,LUIZ (SEE VITAO 968CRE: 993)
YUE,NAI-WEN (SEE HSUECY969ESC: 305)
ZALTA,JEAN-PIERRE (SEE DUPRAM968ECC:1872)
ZEMLYANOVA,N.A. (SEE MAKEVM968BMC:1872)
ZIERLER,KENNETH L. (SEE FALEJT969RBL: 70)

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FUTURE MEETINGS

1970 - University of Missouri, Kansas City

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DEADLINE FOR HERPETOLOGICAL REVIEW

Material for Herpetological Review #8 (September 1969) can be accepted no later than 10 July 1969.

Material for Herpetological Review #9 (December 1969) can be accepted no later than 5 October 1969.

It is preferred that feature articles be submitted prior to the above deadline dates if possible.

CURRENT HERPETOLOGICAL TITLES, VI: 1968-69

BY H.G.DOWLING, I.GILBOA, I.PALSER AND T.SHAMAN

GENERA OF REPTILES
AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK, N. Y. 10024

* * * *

THIS IS THE SIXTH LIST OF CURRENT HERPETOLOGICAL TITLES (SEE HERPETOL. REV. (2-6) FOR PREVIOUS ISSUES.) IT INCLUDES TITLES THAT HAVE COME TO OUR ATTENTION DURING THE PERIOD 2 FEBRUARY THROUGH 25 APRIL 1969. THE RECENT DOCK STRIKE HAS DELAYED RECEIPT OF A NUMBER OF FOREIGN JOURNALS DURING THIS PERIOD. AS BEFORE, A FEW TITLES HAVE BEEN OBTAINED FROM SECONDARY SOURCES, BUT THESE MAKE UP LESS THAN FIVE PER CENT OF THE TITLES LISTED. LIKE THE PREVIOUS LISTS, THIS ONE IS PHOTO-OFFSET REPRODUCTION FROM COMPUTER PRINTOUT.

THE VAST MAJORITY OF LISTED PAPERS IS IMMEDIATELY AVAILABLE TO US. WE ARE BASED AT ONE OF THE GREATEST (AND LIKELY THE MOST ACCESSIBLE) HERPETOLOGICAL LIBRARIES OF THE WORLD. WE ANTICIPATE BEING READY TO ACT AS A BIBLIOGRAPHIC SERVICE IN 1970. HOWEVER, IF YOU ARE REALLY STUCK FOR A REFERENCE NOW, LET US KNOW: WE WILL SEE WHAT WE CAN DO.

THE LIST IS DIVIDED INTO TWO PARTS: TITLES PUBLISHED DURING 1968, AND TITLES PUBLISHED DURING 1969. ALL THESE AND FUTURE 1969 TITLES ARE AVAILABLE ALSO ON 3 X 5 LIBRARY STOCK CARDS ON A YEARLY SUBSCRIPTION BASIS AT 25D DOLLARS A YEAR PER SET.

FUTURE: TO THIS DATE THE CURRENT LIST OF TITLES HAS BEEN NO MORE THAN THAT. HOWEVER, WE HAVE BEGUN TO CROSS-INDEX THE LITERATURE FOR ACCESS THROUGH TAXONOMIC, GEOGRAPHIC, AND SUBJECT AVENUES. WE DO NOT ANTICIPATE PUBLISHING THIS INDEX BUT INSTEAD ARE ATTEMPTING TO COORDINATE OUR EFFORTS WITH BIOLOGICAL ABSTRACTS AND ZOOLOGICAL RECORD. BOTH OF THESE INSTITUTIONS HAVE INDICATED AN INTEREST IN COORDINATING THE INFORMATION OBTAINED HERE WITH THAT DERIVED FROM THEIR OWN SOURCES, BUT WE ARE EXPLORING VARIOUS OTHER POSSIBILITIES.

ACKNOWLEDGMENTS: THIS LIST WAS PREPARED WITH THE AID OF THE HERPETOLOGY DEPARTMENT AND THE LIBRARY OF THE MUSEUM, AND THE DEPARTMENT OF ZOOLOGY AND THE COMPUTER LABORATORY OF THE UNIVERSITY OF RHODE ISLAND. WE ARE ESPECIALLY GRATEFUL FOR THE HELP OF JAMES E. BRADLEY AND HARLAN S. HERSEY OF THE COMPUTER LABORATORY. SEVERAL COLLEAGUES HAVE AIDED BY BRINGING ADDITIONAL LITERATURE TO OUR ATTENTION. FORMOST AMONG THESE ARE JAMES A. PETERS, AND GEORGE J.JACOBS. RICHARD G.ZWEIFEL AND MARGARET S.SHAW, OF THE DEPARTMENT OF HERPETOLOGY, HAVE AIDED THE PROJECT IN MANY SPECIAL WAYS. ROBERT J. WINTER OF THE DEPARTMENT OF ICHTHYOLOGY HAS BEEN VERY HELPFUL WITH TRANSLATIONS FROM SLAVIC JOURNALS. WE ARE GRATEFUL FOR ALL OF THIS HELP. THIS IS CONTRIBUTION NO. 12 OF THE GENERA OF REPTILES PROJECT, WHICH IS SUPPORTED BY THE NATIONAL SCIENCE FOUNDATION (NSF GN-707).

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1968 TITLES

--- A ---

ABRAHAM,A.
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1968 STUDIES ON THE DIGENETIC TREMATODES OF LOUISIANA TURTLES
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ADLER,KRAIG
1968 ELIMINATION OF BOX TURTLES IN WESTERN NEW YORK STATE BY PREHISTORIC MAN
J HERPETOLOGY 2(3-4):179. (ABSTR)

ADLER,KRAIG
1968 EXTRA-OPTIC LIGHT ENTRAINMENT OF CIRCADIAN RHYTHM IN SALAMANDERS (PLETHODON GLUTINOSUS)
J HERPETOLOGY 2(3-4):176. (ABSTR)

ADLER,KRAIG
1968 PSEUDEMYS SCRIPTA IN WEST VIRGINIA: ARCHEOLOGICAL AND MODERN RECORDS
J HERPETOLOGY 2(3-4):117-120, 2 FIG.

AGRAWAL,VINOD
1968 TWO REPTILIAN TREMATODES FROM LUCKNOW.
ANN PARASIT HUM COMP 43(3):333-338, 2 FIG.

ALJURE,EMILIO F. AND LUIS M.BORRERO
1968 THE INFLUENCE OF MUSCLE LENGTH ON THE DEVELOPMENT OF FATIGUE IN TOAD SARTORIUS
J PHYSIOL (CAMBRIDGE) 199:241-252, 4 FIG.

ALLEN,E.ROSS
1968 HOW TO PACK SNAKES FOR SHIPMENT
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ALMACA,CARLOS
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REV FAC CIENC LISBOA 15(2):209-231.

ALTIG,RONALD AND EDMUND BRODIE,JR.
1968 ALBINISTIC AND CYANISTIC FROGS FROM OREGON
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AMER,F.I.
1968 THE ORIGIN OF THE GERM CELLS AND DEVELOPMENT OF THE GONADS IN BUFO REGULARIS REUSS
ZOOL SOC EGYPT BULL 21:39-62, 23 FIG.

AMIRANTE,G.A.
1968 IMMUNO-CYTO-ADHERENCE TESTS IN XENOPUS LAEVIS DAUD.
EXPERIENTIA 24(10):1059-1060, 3 FIG.

ANDERSON,JAMES D.
1968 A COMPARISON OF THE FOOD HABITS OF AMBYSTOMA MACRODACTYLUM SIGILLATUM, AMBYSTOMA MACRODACTYLUM CROCEUM, AND AMBYSTOMA TIGRINUM CALIFORNIENSE
HERPETOLOGICA 24(4):273-284, 2 FIG., 5 TAB.

ANDERSON,JAMES D.
1968 THERMOREGULATION IN AMPHIBIANS
BULL NEW JERSEY ACAD SCI 13(2):35. (ABSTR)

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SPECIES
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ARMS,K.
1968 CYTONUCLEOPROTEINS IN CLEAVING EGGS OF XENOPUS
LAEVIS
J EMBRYOL EXP MORPHOL 20(3):367-374, 1 TAB., 2 PL.

ARVY,LUCIE
1968 LA THYROIDE ET LE METABOLISME CALCIQUE
J PHYSIOL (PARIS) 60(5):405-448, 18 FIG., 6 TAB.

ASHE,JAMES
1968 A NEW BUSH VIPER
J E AFR NATUR HIST SOC 27(1):53-59, 2 FIG., 1 TAB.

ASPLUND,KENNETH KARL
1968 EVOLUTION OF BODY SIZE AND HABITAT SELECTION IN
WHIPTAIL LIZARDS (AVAIL. UNIV. MICROFILMS, ANN ARBOR,
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ASTON,WILLIAM
1968 TERRA ALTA BIOLOGICAL STATION
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1968 ON THE FINDING OF ALSOPHYLAX SPINICAUDA (SQUAMATA,
GEKKONIDAE) IN THE USSR
ZOOL ZH 47(9):1420-1421, 1 FIG. (RUSS, ENGL ABSTR)

AVERITT,GEORGE A.
1968 TIMBER RATTLER WITH SOUTHERN ACCENT
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AVETISYAN,Z.A.
1968 THE STUDY OF PHOTOELECTRIC RESPONSES OF AN
OLFACTORY EPITHELIUM OF A FROG
BIOL ZH ARM 21(7):109-110. (RUSS ABSTR)

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BACHMAYER,H. AND H.MICHL
1968 ON THE TOXIN OF TRITURUS MARMORATUS LATR.
MEM INST BUTANTAN 33(3):903-906, 2 FIG., 1 TAB.

BADER,ROLF
1968 GEHOEREN MOLCHE INS AQUARIUM?
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BANTA,BENJAMIN H. AND DAVID J.MORAFKA
1968 AN ANNOTATED CHECK LIST OF THE RECENT AMPHIBIANS AND
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WITH SOME ECOLOGICAL OBSERVATIONS
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1968 A ONE-EYED EASTERN GRAY TREEFROG (HYLA VERSICOLOR
VERSICOLOR) FROM SOUTH-CENTRAL MICHIGAN
WASMANN J BIOL 26(2):263-265, 1 FIG.

BANTA,BENJAMIN H.
1968 THE RECENT HERPETOFAUNA OF THE TRANSECT OF
PRAIRIE IN EL PASO COUNTY, COLORADO
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LEOPARD LIZARDS (SAURIA: IGUANIDAE). PART II. A
REVIEW OF THE STATUS OF THE BAJA CALIFORNIA
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SUBSPECIES FROM CEDROS ISLAND
GREAT BASIN NAT 28(4):183-194, 6 FIG., 2 TAB.

BARRIO,AVELINO AND MARTA E.MIRANDA
1968 LAS DIFERENTES POBLACIONES DE BOTHROPS ALTERNATA
DUMERIL Y BIBRON (OPHIDIA, CROTALIDAE) DE LA ARGENTINA,
CONSIDERADAS DESDE EL PUNTO DE VISTA MORFOLOGICO Y
ANTIGENICO
MEM INST BUTANTAN 33(3):887-892, 7 FIG. (ENGL SUMM)

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ENTRE LAS DIFERENTES ENTIDADES DEL GENERO MICRURUS
WAGLER (OPHIDIA, ELAPIDAE) DE LA ARGENTINA
MEM INST BUTANTAN 33(3):869-879, 8 FIG. (ENGL ABSTR)

BARRIO,AVELINO
1968 INCORPORATION OF THE FAMILY CENTROLENIDAE (ANURA)
TO THE ARGENTINE BATRACHOFAUNA
PHYSIS 28(76):165-169, 2 FIG. (PORT, ENGL ABSTR)

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1968 REVISION DEL GENERO LEPIDOBATRACHUS BUDGETT (ANURA,
CERATOPHRYNIDAE)
PHYSIS 28(76):95-106, ILLUS. (PORT, ENGL ABSTR)

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SPERMATOGENESIS IN RANA HEXADACTYLA LESSON
J EXP ZOOL 169(2):133-142, 4 FIG., 3 TAB.

BECAK,W., MARIA LUIZA BECAK AND F.G.DE LANGLADA
1968 ARTIFICIAL TRIPLOID HYBRIDS BY INTERSPECIFIC
MATING OF ODONTOPHRYNUS (AMPHIBIA, ANURA)
EXPERIENTIA 24(11):1162-1164, 3 FIG.

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BENL,GERHARD
1968 DER AXOLOTL IM SCHULAQUARIUM
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1969 SEX INDEPENDENT GROUND COLOR IN THE TIMBER RATTLESNAKE, CROTALUS HORRIDUS HORRIDUS
HERPETOLOGICA 25(1):65-66, 1 FIG., 1 TAB.

SCHALL,JOSEPH
1969 SEA SNAKES - MYSTERIOUS MARINERS
FRONTIERS 33(3):12-14, ILLUS.

SCHILB,THEODORE P.
1969 EFFECT OF A CHOLINERGIC AGENT ON SODIUM TRANSPORT ACROSS ISOLATED TURTLE BLADDERS
AMER J PHYSIOL 216(3):514-520, 2 FIG., 3 TAB.

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ENGELHARDTIA 2(1):5-6.

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SCI NEWS 94(7):170, ILLUS.

SCHWARTZ,ALBERT AND RICHARD THOMAS
1969 A REVIEW OF ANOLIS ANGUSTICEPS IN THE WEST INDIES
QUART J FLORIDA ACAD SCI 31(1):51-69, 2 FIG.

SENN,DAVID AND DONALD C.GOODMAN
1969 CEREBELLAR CORTICOFUGAL PROJECTIONS IN THE ALLIGATOR (CAIMAN SCLEROPS)
ANAT REC 163(2):324-325. (ABSTR)

SENTEIN,PAUL AND DOMINIQUE TEMPLE
1969 RELATIONS NUCLEOCYTOPLASMIQUES DANS LES SPERMATOGONIES PRIMAIRES DE TRITURUS HELVETICUS RAZ. AU COURS DE LEUR EVOLUTION
C R ACAD SCI (PARIS) D 268(3):540-542, 9 FIG.

SETO,TAKESHI, JAMES KEZER AND CHARLES M.POMERAT
1969 A CINEMATOGRAPHIC STUDY OF MEIOSIS IN SALAMANDER SPERMATOCYTES IN VITRO
Z ZELLFORSCH 94(3):407-424, 36 FIG., 1 TAB.

SHIMONO,T., D.T.KENNEDY, S.T.KITAI AND D.GONZALEZ
1969 LAMINAR ANALYSIS OF THE CEREBELLAR CORTEX OF THE LIZARD (LACERTA VIRIDIS)
ANAT REC 163(2):325. (ABSTR)

SHOEMAKER,R.L., G.M.MAKHLOUF AND G.SACHS
1969 INTRACELLULAR POTENTIALS OF IN VITRO NECTURUS GASTRIC MUCOSA
BIOPHYS J 9:263. (ABSTR)

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1969 ROLE OF THE OOCYTE NUCLEUS IN PHYSIOLOGICAL MATURATION IN RANA PIPIENS
DEVELOP BIOL 19(3):281-309, 7 FIG., 4 TAB.

SOKOL,OTTO M.
1969 FEEDING IN THE PIPID FROG HYMENOCHIRUS BOETTGERI (TORNIER)
HERPETOLOGICA 25(1):9-24, 8 FIG.

SPRENT,J.F.A.
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AQUAR TERR Z 22(1):26-27, ILLUS.

STERBA,G. AND G.BRUECKNER
1969 ELECTRON MICROSCOPICAL INVESTIGATION ON THE REACTION OF THE PITUICYTES AFTER STALK SECTION IN RANA ESCULENTA
Z ZELLFORSCH 93(1):74-83, 6 FIG. (GER, ENGL SUMM)

STIMSON,ANDREW F.
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Z.N.(S.) 1856
BULL ZOOL NOMENCL 25(4-5):186-187.

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1969 TYRAMINE, CATECHOLAMINES AND THE ACTION OF VASOPRESSIN ON STIMULATION OF WATER EFFLUX IN TOAD BLADDERS
ARCH BIOCHEM BIOPHYS 129(1):277-282, 2 FIG., 4 TAB.

SULAHIAN,ANNIE AND JOHN F.SCHACHER
1969 SAUROSITUS BAAL SP. N., A FILARIAL WORM FROM THE LIZARD AGAMA STELLIO IN LEBANON, WITH NOTES ON SAUROSITUS MACFIEI FITZSIMMONS, 1958
J PARASITOL 55(1):104-107, 8 FIG., 2 TAB.

SWEAT,DONALD E.
1969 CAPTURE OF A TAGGED RIDLEY TURTLE
QUART J FLORIDA ACAD SCI 31(1):47-48.

SWIFT,T.J. AND O.G.FRITZ,JR.
1969 A PROTON SPIN-ECHO STUDY OF THE STATE OF WATER IN FROG NERVES
BIOPHYS J 9(1):54-59, 2 FIG., 1 TAB.

--- T ---

TASSAVA,ROY
1969 SURVIVAL AND LIMB REGENERATION OF HYPOPHYSECTOMIZED NEWTS WITH PITUITARY XENOGRAFTS
ANAT REC 163(2):274. (ABSTR)

TAYLOR,J.W.
1969 BLOCKAGE OF THE RECOVERY OF THE FAST PHOTOVOLTAGE FROM THE FROG RETINA
BIOPHYS J 9:243. (ABSTR)

THOMPSON,PATRICK H.
1969 FEEDING OF FORCIPOMYIA FAIRFAXENSIS ON GRASS FROGS (RANA SPP.) IN NEW JERSEY
ANN ENTOMOL SOC AMER 62(2):451-452.

THORN,ROBERT
1969 REMARKS ON SALAMANDRA ATRA LAWRENTI, THE EUROPEAN SALAMANDER
BULL PHILAD HERPETOL SOC 15(1969):2-6.

TILLEY,STEPHEN G.
1969 VARIATION IN THE DORSAL PATTERN OF DESMOGNATHUS OCHROPHAEUS AT MT. MITCHELL, NORTH CAROLINA, AND ELSEWHERE IN THE SOUTHERN APPALACHIAN MOUNTAINS
COPEIA 1969(1):161-175, 7 FIG., 1 TAB.

TIMKEN,RICHARD L.
1969 ORNATE BOX TURTLE DISTRIBUTION IN SOUTH DAKOTA
HERPETOLOGICA 25(1):70.

TITLBACH,M.
1969 THE IDENTIFICATION OF THE TYPES OF LANGERHANS ISLETS CELLS. PART II. ELECTRON MICROSCOPICAL STUDY
FOLIA MORPHOL (PRAQUE) 27(1):17-22.

TITLBACH,M.
1969 THE IDENTIFICATION OF THE TYPES OF LANGERHANS ISLETS CELLS. PART I. LIGHT MICROSCOPICAL STUDY
FOLIA MORPHOL (PRAQUE) 27(1):1-16, 18 FIG.

TOLL,DAVID W.
1969 THE SONORAN DESERT NATIONAL PARK
NAT PARKS MAG 43(256):4-8, ILLUS.

TOMLINSON,JACK T.
1969 STREAMLINING AND CONVERGENT EVOLUTION
TURTOX NEWS 47(1):46.

TONOSAKI,AKIRA AND DOUGLAS E.KELLY
1969 ELECTRON MICROSCOPIC STUDY OF THE IRIS OF JUVENILE NEWTS (TARICHA TOROSA)
ANAT REC 163(2):275. (ABSTR)

TREADWELL,R.W. AND TERRY HIBBITTS
1969 TANTILLA DIABOLA FROM VAL VERDE COUNTY, TEXAS
TEXAS J SCI 20(3):281-282, 1 FIG., 1 TAB.

TRUTNAU,LUDWIG
1969 GEFANGENSCHAFTSBEOBACHTUNGEN AN DER BERGOTTER (VIPERA XANTHINA XANTHINA /GRAY, 1849/)
AQUA TERRA 6(2):21-22, ILLUS.

TWEEDLE,CHARLES D.
1969 GROWTH RELATIONSHIPS IN SINGLE AND DOUBLE AMPUTATIONS OF AMBYSTOMA LARVAE
ANAT REC 163(2):278. (ABSTR)

--- U ---

UZZELL,THOMAS
1969 A NEW GENUS AND SPECIES OF TEIID LIZARD FROM BOLIVIA
POSTILLA (129):1-15, ILLUS.

--- V ---

VAN BOURGONDIEN,(SISTER) THERESE M. AND RICHARD C.BOTHNER
1969 A COMPARATIVE STUDY OF THE ARTERIAL SYSTEMS OF SOME NEW WORLD CROTALINAE (REPTILIA: OPHIDIA)
AMER MIDLAND NAT 81(1):107-147, 12 FIG., 3 TAB.

VAN DEVENDER,THOMAS R.
1969 A RECORD OF ALBINISM IN THE CANYON TREE FROG, HYLA ARENICOLOR COPE
HERPETOLOGICA 25(1):69.

VILLEGAS,LEOPOLDO
1969 THE ACTION OF AMYTAL ON WATER FLUX THROUGH FROG GASTRIC MUCOSA
BIOPHYS J 9:265. (ABSTR)

VISENTIN,LOUIS P. AND JOHN M.ALLEN
1969 ALLANTOINASE: ASSOCIATION WITH AMPHIBIAN HEPATIC PEROXISOMES
SCIENCE 163(3874):1463-1464, 3 FIG.

VISSER,J.D.
1969 TWO LIZARD COLLECTING TRIPS IN THE CAPE PROVINCE
BULL PHILAD HERPETOL SOC 15(1969):25-28. (REPRINTED FROM) J HERPETOL ASS AFR 1966(2):17-20.

VIVIEN-ROELS,BERTHE
1969 THE PINEAL ORGAN OF A REPTILE, PSEUDEMYS SCRIPTA ELEGANS: LIGHT AND ELECTRON MICROSCOPIC STUDIES
Z ZELLFORSCH 94(3):352-390, 17 FIG., 1 TAB.
(FR, ENGL SUMM)

VRIES,TJITTE DE
1969 GALAPAGOS VITRINE DER EVOLUTIE
ARTIS 14(5):172-179, ILLUS.

--- W ---

WADSWORTH,NELSON
1969 NEW LIGHT ON SNAKEBITE
OUTDOOR LIFE 143(3):47-49, 150-155, ILLUS.

WAKE,DAVID B. AND NECLA OZETI
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COPEIA 1969(1):124-137, 7 FIG., 3 TAB.

WAKE,DAVID B.
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ANAT REC 163(2):330-331. (ABSTR)

WAKE,MARVALEE H.
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COPEIA 1969(1):183-184.

WAKE,MARVALEE H.
1969 KIDNEY MORPHOLOGY IN TERRESTRIAL AND AQUATIC CAECILIANS
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WATERS,JOSEPH H.
1969 ADDITIONAL OBSERVATIONS OF SOUTHEASTERN MASSACHUSETTS INSULAR AND MAINLAND POPULATIONS OF PAINTED TURTLES, CHRYSEMYS PICTA
COPEIA 1969(1):179-182, 2 FIG.

WEBSTER,T.PRESTON
1969 ECOLOGICAL OBSERVATIONS ON ANOLIS OCCULTUS WILLIAMS AND RIVERO (SAURIA, IGUANIDAE)
BREVIORA (312):1-5.

WEINTRAUB,JOEL D.
1969 SIZE RELATIONSHIPS OF THE GRANITE SPINY LIZARD, SCELOPORUS ORCUTTI
HERPETOLOGICA 25(1):25-29, 3 TAB.

WEIS,JUDITH S.
1969 STUDIES ON NERVE GROWTH FACTOR IN AMBYSTOMA MACULATUM
ANAT REC 163(2):331. (ABSTR)

WELLS,MICHAEL A. AND DONALD J.HANAHAN
1969 STUDIES ON PHOSPHOLIPASE A. I. ISOLATION AND CHARACTERIZATION OF TWO ENZYMES FROM CROTALUS ADAMANTEUS VENOM
BIOCHEMISTRY 8(1):414-424, 11 FIG., 3 TAB.

WERTZ,JAMES M.
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BULL PHILAD HERPETOL SOC 15(1969):53-55.

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1969 VISIT THE MACRO-WORLD...IT'S EVERYWHERE - A WORLD OF MINIATURE WILDLIFE WAITING TO BE WATCHED
TEXAS PARKS WILDL 27(3):24-27, ILLUS.

WITHAM,ROSS AND ARCHIE CARR
1969 RETURNS OF TAGGED PEN-REARED GREEN TURTLES
QUART J FLORIDA ACAD SCI 31(1):49-50.

WRIGHT,JOHN W.
1969 STATUS OF THE NAME CNEMIDOPHORUS PERPLEXUS BAIRD AND GIRARD (TEIIDAE)
HERPETOLOGICA 25(1):67-69, 1 TAB.

--- Z ---

ZADUNAISKY,J.A. AND M.A.LANDE
1969 THE CONTROL OF TRANSPARENCY BY ACTIVE CHLORIDE TRANSPORT IN THE ISOLATED FROG CORNEA
BIOPHYS J 9:228. (ABSTR)

ZEITHAMMER,JUERGEN
1969 SIND ZECKEN WIRKLICH HARMLOS?
AQUAR MAG 3(1):16-17.

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* * * *

ABOOD,LEO G. (SEE SNIDSR968SNT: 1)
ACEVES,J. (SEE ERLID 969STA: 163)
ALBRIGHT,JOHN T. (SEE MICHJE969UOD: 316)
ALCALA,ANGEL C. (SEE CROOPG968EPL: 323)
ALFAU,CARMEN DE (SEE JAKOS 969MPO: 306)
ALLEN,JOHN M. (SEE VISELP969AAA:1463)
ANDREOLETTI,G.E. (SEE FASOA 968HAA:1177)
ASHGAR,S.S. (SEE DEVIA 968NAS: 943)
BACHARACH,A.D.E. (SEE HALLMO969IVP: 303)
BADANO,B.N. (SEE VIDAJC968IET: 913)
BAGNARA,JOSEPH T. (SEE HADLME969INC: 69)
BAILEY,GEORGE S. (SEE NAKAM 969PPP: 681)
BAIRD,CHRISTINE E. (SEE ABE K 969AMC: 362)
BALDWIN,ROGER (SEE MCCLL 969RWU: 381)
BAPTISTA,LUIS (SEE GORMGC969CSR: 6)
BARRIO,A. (SEE CARLNJ968ASP: 679)
BEALL,R.J. (SEE PRIVCA968TIR: 33)
BEAUMONT,ANDRE (SEE REGAE 968ATL:1983)
BECAK,MARIA LUIZA (SEE BECAW 968ATH:1162)
BEETSCHEN,JEAN-CLAUDE (SEE DUPRAM968ECC:1872)
BEIDLER,LLOYD M. (SEE BARGFG969LRA: 242)
BELLEC,ANNIE (SEE STOLJ 968ADE:1308)
BELLIS,EDWARD D. (SEE BARTGT969HND: 148)
BERGERHOFF,K. (SEE LEISKH969HID: 105)
BERGER,RONALD O. (SEE COMIDE969GPA: 319)
BERTINI,F. (SEE PIEZRS969DGA: 244)
BEZRUCHKO,S.M. (SEE KUL AS968DRP:1257)
BLACKBURN,GLENN K. (SEE MACKTN969PVA: 266)
BLAIR,W.F. (SEE BOGAJP969CCV: 30)
BLASINI DE AUSTIN,SHEILA (SEE HEATH 969DEW: 245)
BLASINI DE AUSTIN,SHEILA (SEE HEATH 968HTT: 807)
BOGDANOV,O.P. (SEE ATAEC 968FAS:1420)
BONHOMME,CH. (SEE POURR 968TAU: 255)
BORRERO,LUIS M. (SEE ALJUEF968IML: 241)
BOQUET,P. (SEE MEAUJ 968AVN: 929)
BOTBOL,VIOLETA (SEE CARLNJ968ASP: 679)
BOTHNER,RICHARD C. (SEE VAN TM969CSA: 107)
BOULOS,R. (SEE HUSSMF968SHD: 29)
BOVERIS,A. (SEE VIDAJC968IET: 913)
BOYSE,EDWARD A. (SEE CAMEPE968SSP: 392)
BRODIE,EDMUND,JR. (SEE ALTIR 968ACF: 241)
BROTHERS,NANCY (SEE MORLH 968AAR:1222)
BRUECKNER,G. (SEE STERG 969EMI: 74)
BUCHANAN,HILAIRE (SEE NYE ER969ATR: 483)
BURLEY,F.WILLIAM (SEE SMITHM968NAA: 147)
BURNSTOCK,G. (SEE KIRBS 969PSC: 321)
BURNSTOCK,G. (SEE KIRBS 969CPS: 307)
BURNLEY,JOHN M. (SEE SCHLFC968ALS: 74)
BURY,R.BRUCE (SEE GORMGC969CSR: 6)
BUTCHER,REGINALD W. (SEE ABE K 969AMC: 362)
BUTCHER,R.W. (SEE ABE K 969MLA: 21)
BYRD,WILLIAM W. (SEE JORDOR968SOR: 335)
CALVENTI,IDELISA BONNELLY DE (SEE JAKOS 969MPO: 306)
CAMPBELL,HOWARD W. (SEE HARTPH969AVR:1221)
CARL,GARY (SEE BANTBH9680EG: 263)
CARR,ARCHIE (SEE WITHR 969RTP: 49)
CAUTHEN,NELSON R. (SEE WAGNMK968CRI: 225)
CHALUMEAU-LE FOULGOC,MARIE-THERESE (SEE AIMAC 969AEP: 368)
CHANG,C.C. (SEE LEE CY968PPC:1009)
CHAPPELL,L.CARLTON (SEE HINETC968ARF: 1)
CHAUVET,J. (SEE ACHER 969ENH: 759)
CHAUVET,M.T. (SEE ACHER 969ENH: 759)
CHAVIN,W. (SEE CHENYM968ITA: 31)
CHIU,T.H. (SEE TSENLF968ADI: 526)
CHIU,T.H. (SEE LEE CY968PPC:1009)
CIVAN,MORTIMER M. (SEE DIBODR969AST: 1)
COOKE,D. (SEE HARRP 969MFI: 184)
COOPER,MARTHA R. (SEE COOPJE968SGG: 19)
CORSIN,J. (SEE DEVIC 9680DC: 413)
COX,RONALD (SEE CARTWA968ARK: 66)
CRABBE,J. (SEE DE WP 968RNA: 280)
CSOBALY,S. (SEE KAPAE 968IVE: 498)
DANIELYAN,F.D. (SEE DAREIS968DTP: 65)
DANIEL,P.J. (SEE ROWEDT968TD : 53)
DARLINGTON,R.W. (SEE GRAVM 968PHF: 467)
DAS,ASIT B. (SEE KRISRV968CPS: 221)
DAVIES,H.G. (SEE TOOZJ 968LEM: 521)
DAVIS,W.K. (SEE CAMPPM968VSB: 327)
DEHLINGER,PETER J. (SEE MILLLK969NFL: 915)
DE JONGH,H.J. (SEE GANSC 969BRC:1223)
DELORI,P. (SEE BRISL 968EFO: 463)
DU PRE,FRANK (SEE MARSG 969MFS: 14)
DUFAURE,J.P. (SEE HUBEJ 968NSD: 135)



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NUMBER 7 / JUNE 1969

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SEE PAGE 4 OF THIS ISSUE

FOR DUES INFORMATION

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Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor.

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EDITOR - JOSEPH T COLLINS

•CONTENTS

3 SSAR 1969 Annual Meeting at Carbondale, Illinois

5 The Second Century of Alfredo Duges, Father of Mexican Herpetology, by Hobart M. Smith and Robert W. Reese

8 Book Review: Snakes, The Keeper and the Kept, by Carl Kauffeld (Hobart M. Smith)

8 Grants for North American Faunal Studies

9 New from Institutions: Herpetological Research at Southern Illinois University

9 Members Desiderata

9 New Books and Reprints

10 SSAR Treasurer's Report - 1968

11 Current Herpetological Titles VI: 1968-69, by H. G. Dowling, I. Gilboa, I Palser, and T. Shaman

SSAR meeting at Carbondale

THIS SUMMER'S SSAR MEETING

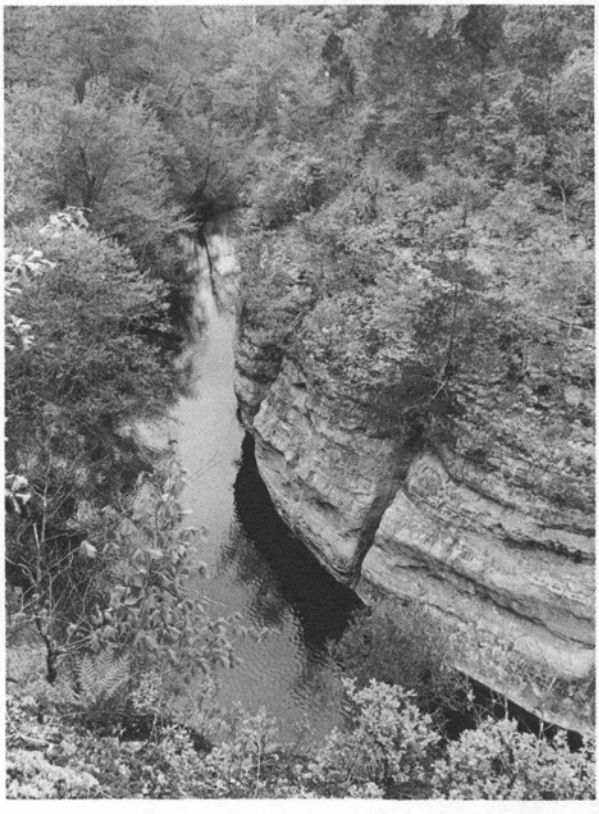
The twelfth annual meeting of the Society will be held 5-7 September 1969, on the Carbondale campus of Southern Illinois University. Carbondale, a small city of 20,000 residents, is located approximately 100 miles southeast of St. Louis and 170 miles northeast of Memphis, at the northern edge of the Shawnee Hills Section of Illinois, just 60 miles above the confluence of the Mississippi and Ohio rivers. The setting is rural, with forests, orchards, and small farms interspersed at a mean elevation of 450 feet. Only a few miles from Carbondale are Shawnee National Forest, Crab Orchard Lake and National Wildlife Refuge, and several state parks.

Paper sessions will be held in Lawson Hall, a new classroom building composed solely of auditoriums. Neely Hall will provide dormitory sleeping quarters; both buildings are air conditioned. Restaurants and additional lodging accomodations are available in Carbondale, and within 10-15 miles of town are some 500 campsites. During the lull between quarters the campus will be relatively free of SIU's 21,000 students.

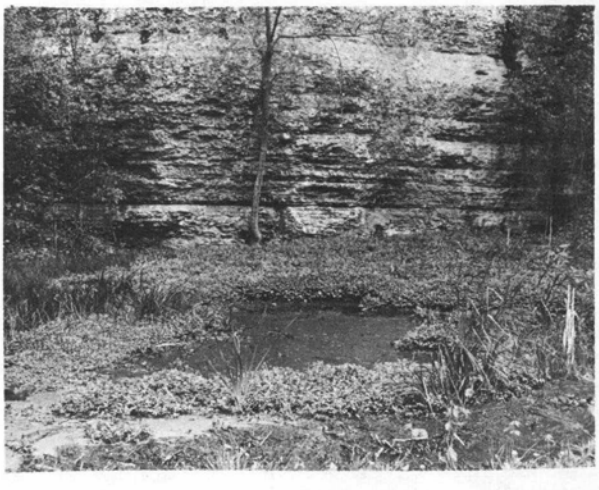
Tentatively planned are the Board of Director's meeting Friday evening, paper sessions on Saturday and Sunday, a banquet and social evening Saturday at SIU's Little Grassy Outdoor Laboratory, and a Saturday bus excursion (for the ladies and children) through scenic hill and orchard country, Shawnee Forest, Bald Knob, Pine Hills, and the Mississippi River bottoms. A display of photographs is planned. Photos should be sent to Ronald G. Altig, Department of Zoology, Mississippi State University, State College, Mississippi 39762.

Details of the program, registration, local accomodations and transportation will be mailed to members in mid-May. Ronald A. Brandon, Department of Zoology, Southern Illinois University, Carbondale 62901, is serving as meeting chairman.

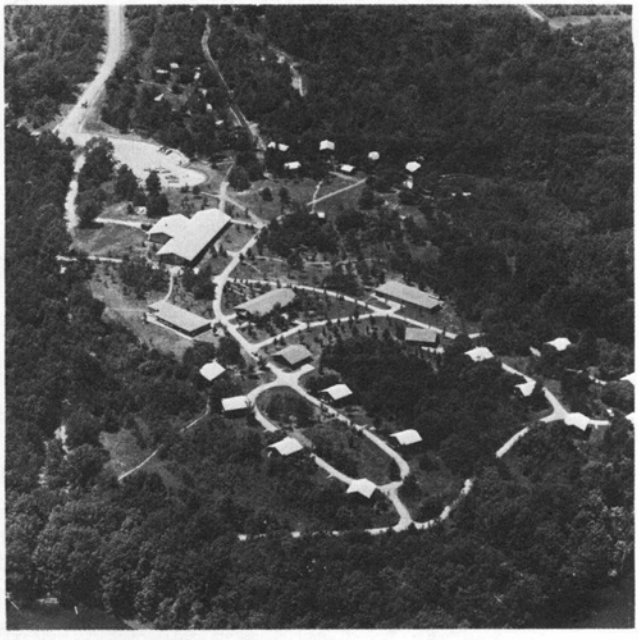
the meeting site



Persons attending the SSAR 11th annual meeting at SIU will see sights such as this scenic area near Carbondale, Illinois.



The SSAR annual meeting will feature such collecting areas as La Rue Spring in the Pine Hills area of Union County, Illinois. This is the habitat of Rana clamitans, Acris crepitans, Hyla cinerea, Siren intermedia, Plethodon dorsalis, Eurycea lucifuga, E. longicauda, Sternothaerus odoratus, Farancia abacura, Agkistrodon piscivorus, Natrix erythrogaster, and others.



An aerial view of SIU's Little Grassy Outdoor Laboratory. The SSAR Saturday banquet and social get-together will be held here.



The paper sessions of the SSAR annual meeting will be held in SIU's modern Lawson Hall.

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SOCIETY DUES FOR 1969

Dues for calendar 1969 are: Regular member (U. S. and Canada) - $6. 00; Foreign member - $5. 00 (via international money order); Sustaining member - $8. 00; Contributing member - $15. 00; and Life member - $100. 00. Institutional subscription is $10. 00.

The Second Century of Alfredo Dugès, Father of Mexican Herpetology

By

Hobart M. Smith and Robert W. Reese

Alfredo Dugès, 1826-1910, has long been famous as the father of Mexican herpetology. He published 83 articles and books, in his lifetime, that concerned Mexican herpetology and his 1896 synopsis of the Mexican herpetofauna stood until 1950 as the only summary of that complex fauna. Even today his contributions require the attention of every monographer of any herpetozoon group occurring in Mexico. An important future role for his works published before his death has been underwritten by a recent digest in detail (Smith and Smith, 1969).

As indicated in the latter work (p. 4), ". . . incredible handicaps to scientific endeavor . . . beset Dugès in his life in Mexico . . .: the illnesses (including deafness), the vagaries of employment, the necessity for extreme frugality, the isolation from scientific centers, the deplorable library facilities, and the magnitude of frustration and depression these handicaps created. Dugès' accomplishments appear heroic indeed under the conditions he encountered. Under the more favorable conditions enjoyed by many of his contemporaries his productivity would no doubt have approached the best of his time; his actual circumstances would surely have completely defeated most scientists. Despite his relatively meager productivity, as compared with Cope, Boulenger, Bocourt, Duméril and other top-flight herpetologists of the period, Dugès merits the accolade of equality with even these scientific greats, judged upon the basis of proportion of output to circumstantial limitation."

Until recent years, the scholarly rank of Alfredo Dugès has of necessity been judged upon the basis of his works published before his death. Like many other great scholars, however, he continued writing in his final years and died with numerous works in various stages of completion. This discovery was made by Prof. Marcos Areliano Armenta, and his wife Irma Bustos de Areliano, as a result of their long-standing devotion to the heritage of the University of Guanajuato from Alfredo Dugès, in the form of the Museum bearing his name: the Museo Alfredo Dugès. When Mr. Arellano was a student in biology at the University of Guanajuato, his interest was centered irrevocably upon the Museum through the influence of Manuel Maldonado Koerdell, who studied and reported in detail the amphibian collection there (Maldonado-Koerdell, 1948). As he received his degree and continued with postgraduate study, he maintained his interest, reviewing in 1952 the scope and content of the Museum.

In these and subsequent years he became acquainted with Prof. Rodolfo R. Ramírez of Guanajuato, who had been an assistant to Dugès in his last years. In fact Prof. Ramírez was with Dugès at his death, and he later assumed responsibility of safe-keeping and publication of Dugès' manuscripts and illustrations that were in final, or nearly final, form. These he acquired from Miss Maria Híjar, a member of the family with whom Dugès lived after the death of his wife, and to whom the materials were bequeathed. Indeed the task of assuring their safety was of such great magnitude, as revolution swept the country, that publication became of secondary importance. In 1954 Prof. Ramirez died, leaving full instructions for the destiny of Dugès' scientific materials to his adopted son, Dr. Janaro González Reyna. The library was, unfortunately, sold to a bookstore in Mexico City.

As a student in early years, and later as Director of Biology and Curator of the Dugès Museum, Prof. Arellano persistently urged that the unpublished original material left by Dugès should be made available to science. In due time he was able to acquire all of the remaining original unpublished materials, with minor exceptions. Included are about 270 large watercolor plates, of which the majority are now in the possession of the Dugès Museum, beautifully illustrating various animal species of Mexico; correspondence with other scientists of the period (including letters from Asa Gray and E. D. Cope); several unpublished sets of handwritten notes in a notebook; and an extensive revision of his textbook of zoology. There are also about 500 5x7 inch black and white botanical drawings as well as a large number of small watercolors of various faunal groups. Of these smaller color plates many are evidently copies of illustrations contained in other publications. When this occurs, there is no signature, but a cryptic note such as "Wilson" will be found which possibly indicates the publication from which it was taken. All originals carry his distinctive signature.

The plates, both black and white and color, that remain in the possession of the Arellanos are in excellent condition. In their attention to detail they are typical of the handwork of many of the oldtime naturalists. Many of the illustrations are dated, and a decrease in quality can be detected as Dugès advanced in years.

In addition to these materials, the Arellanos discovered a remarkable collection of photographs of Dugès and his colleagues in the family possessions of the successors of the famous professional photographer and

international award winner Romualdo García, a student and subsequently a partner of the photographic firm of Ignacio Rocha and the chemist Vicente Fernández. All were personal friends of Dugès, and the glass plate collection includes many of Dugès, his colleagues, and events of his time. These form an important part of the incomparable and unique library of Dugèsiana now owned by Prof. and Mrs. Arellano.

A very small part of the correspondence, of the revised textbook, of the zoological plates and of the photographs have been published by Prof. and Mrs. Arellano (see accompanying bibliography). It is their intent eventually to publish all significant parts, donating the entire collection to that institution willing to underwrite their publication. At present writing Prof. Arellano is not connected with the University of Guanajuato, but can, however, be addressed at Apartado Postal 121, Guanajuato, Gto., Mexico.

Many details of Dugès' life remain to be clarified. The events which led to his establishment in Guanajuato, the extent to which he practiced medicine, the origin and sequence of academic appointments, the family history of his wife, the circumstances of his courtship and marriage, are all largely unknown. Perhaps some of these unknown facets of his life, as well as others, may receive some light from these documents, the analysis of which should be pursued without delay.

Situated as they are in the long-time home of Dugès, the Arellanos will no doubt uncover still other new sources of information on the life of Dugès. For example, they have kindly provided us with a copy of the death certificate of Dugès' wife, Luisa Frey de Dugès, filled May 4, 1886, in which it is confirmed that she died of pneumonia at the age of 69, on May 3, 1886, at 3:30 pm. and that she was the legitimate daughter of Carlos Frey and Maria Juana Beaurepaire, both then deceased.

Through the kindness of Prof. and Mrs. Arellano the junior author had the pleasure of examining most of their Dugèsiana, and would like to express his gratitude for the privilege. We are indebted to them also for their very kind provision of most of the information here reported and for reprints of some of their publications pertaining to Dugès, a complete list of which is appended through their courtesy. They likewise have furnished us with a remarkable formal photographic portrait of Dugès (Fig. 1), hitherto published only in the article on Dugès and malaria (Arellano, 1965b). In response to a specific inquiry, they in addition sought out and photographed for us (Fig. 2) the tombs of Alfredo Dugès and his immediate family, all surprisingly impressive.

Thus has begun a revival from varied sources of interest in the work of Dugès. With the publication posthumously of his manuscripts by Prof. Arellano, the productivity of this outstanding scholar enters its second century.



Figure 1. Alfredo Dugès, 1878. Photograph by Rocha and Fernandez.



Figure 2. The tomb of Alfredo Dugès in the graveyard of Guanajuato, Gto., Mexico, viewed by Prof. Marcos Arellano. The apex of the columnar gravestone extends only very slightly out of the picture; the column appears broken, but was so designed perhaps to represent mortal life.

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Department of Biology, University of Colorado, Boulder; and Department of Biology, St. Edwards University, Austin, Texas.

book review

Snakes: The keeper and the kept. By Carl Kauffeld. Doubleday & Co., Inc., Garden City, New York. xiv, 248 pp., 39 figs. $5.95.

This is two books rolled into one - (1) an essay on care of snakes, accompanied by five appendices giving basic information of interest to anyone beginning to develop serious interest in snakes; and (2) an account of the emotions, reflections, observations and events related to several of the author's collecting trips to various parts of the United States.

The obligations of a writer to the constructive instruction of his reader were taken seriously by Kauffeld, who lost no opprotunity to advance reader-awareness of the need for conservation, not only of snakes but of the entire communities of which they are a part, and for conscientious care of captured animals. At the same time he successfully portrayed the thrills and satisfaction of both the search for and the care of snakes.

Particularly in the first section of 92 pages of the book, largely about care of snakes in captivity, is narration and advice successfully blended. In fact this is the best source known to me for information on snake care, since it provides, with examples drawn from the author's wide experience, precise details on "how" as well as "what," expands on the advantages and disadvantages of different techniques, and thus provides for a real understanding by the reader of the varied factors involved in snake care, enabling him to exercise to a degree the judgement of an experienced keeper. Kauffeld's account provides the touch of reality that most books on snake care most seriously lack.

The appendices are widely separated from the introductory pages on snake care, but an adjunct in subject matter. The first appendix of six pages, lists 35 groups of North American snakes and gives their food, desirability for maintenance in captivity, and peculiarities, if any, that require special attention. The second appendix, of six pages, is an essay on scientific names - their origin, construction, basis of application and utility. The third appendix, of one page, calls attention to the need and basis for standardization of common names. The fourth appendix, of one page, lists 12 major popular reference works about snakes. The fifth appendix, of two pages, cites and gives addresses of scientific herpetological societies of the country and gives a few words of sage advice about the establishment, conduct and prognosis for success of amateur societies. All these appendices give much advice not commonly available for the budding herpetologist.

The second section of the book (139 pp.) is occupied with narratives of various field trips, and is useful not only as a means of introduction of readers to the very tangible thrill of the quest for snakes, but as propaganda for exercise of maturity in the hunt. Too often a field trip in search of snakes is an almost mad, often destructive, singleminded pursuit that leaves the habitat plundered and the collector oblivious to the majesty of the ecological community he has invaded. With frequent reference to the fascinating diversity of the several haunts described of snakes, Kauffeld forces the reader to become aware that there is so much more to the search for snakes than the discovery and capture of specimens that he can never pursue them again with the same detachment from their surroundings as before.

It may well be wished that every young enthusiast for snakes be led to read this book, which constitutes in the reviewer's opinion the soundest indoctrination in existence to both the charm and responsibility of study, however amateurish or professional, of living reptiles in their natural haunts and in captivity. Indeed it would repay perusal even by many experienced herpetologists - as it has the reviewer.

HOBART M. SMITH, Department of Biology, University of Colorado, Boulder.

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GRANTS FOR NORTH AMERICAN STUDIES

The American Museum of Natural History has established the Theodore Roosevelt Memorial Fund to "help provide the necessary means of encouraging studies on the North American fauna to which Theodore Roosevelt, 26th President of the United States, devoted so much of his time and energy." Grants, in small amounts, will be made to individuals conducting research in any phase of wildlife conservation, animal ecology, or in related fields of North American natural history included in the activities of the American Museum, and located geographically north of the southern boundary of continental United States. Preferably, grants will be made to younger scientists, particularly to graduate students. Deadline for grants for the current calendar year is 15 April 1969. For application forms and additional information write to the Director, The American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024.

news from institutions

CURRENT HERPETOLOGICAL RESEARCH

Currently five doctoral students at SIU-Carbondale have research interests in herpetology. John S. Garton and Earl W. Harris are studying ecology of semi-aquatic snakes in southern Illinois, particularly Natrix and Agkistrodon piscivorus. Joseph C. Besharse is investigating ontogenetic degeneration of the eyes of Typhlotriton spelaeus, the grotto salamander. James R. Wiley contemplates studying geographic variation and ecology of Cryptobranchus, and Raymond T. Schaaf, Jr. intends to study some aspect of Rana ecology. Ronald A. Brandon has been interested in reproductive ecology of newts and tiger salamanders in southern Illinois, ecology of green tree frogs and a few other amphibians at SIU's Pine Hills Field Station, and is establishing a laboratory breeding colony of Bathysiredon dumerili, the ambystomatid salamander endemic to Lake Patzcuaro, Michoacan, Mexico (Garton spends much time dangling liver before their snouts). A large cistern at the edge of campus has been converted into an underground laboratory (approximately 150 square feet on two levels) suitable for maintaining cave-adapted salamanders for experimental purposes.

members desiderata

Hobart M. Smith, Department of Biology, University of Colorado, Boulder 80302, wishes to obtain one copy of the 77 microcards issued by Meade Natural History Library, Tulane University, constituting a copy of "Tracts, Collected by U. S. National Museum," Vols. 41-44, Reptiles and Batrachians, Vols. I-IV.

Thomas E. Lott, 20th Pvnt Med Unit (SVC) (FLD), APO San Francisco 96227, wishes to obtain any recent reference works on the serpent fauna of Indo-China. Mr. Lott is currently building a collection of preserved snakes from Viet Nam. These specimens will eventually be deposited in a major museum.

V. F. Taylor, 47 Baden Road, Gillingham, Kent, England, wishes to set up a British Committee to control the import of reptiles from other countries. The aim of this Reptile Import Control Council is to provide an early warning system to help safeguard reptile species in danger of extinction either on a local or a total scale.

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new books & reprints

Biology of the Reptilia: Volume 1. Morphology A. (Edited by A. d'A. Bellairs and T. S. Parsons). General Editor: Carl Gans. 1969. Available from: Academic Press, London, England, for 80s. (Note: This is the first of a multi-volume work).

Encyclopedia of Paleoherpetology: Part 9. Proganosauria, Bolosauria, Placodontia, Araeoscelidia, Trilophosauria, Weigeltisauria, Millerosauria, Rhynchocephalia, Protorosauria. Edited by Oakar Kuhn. 1969. (in German). 74 pages. 27 illustrations. Paperbound. Available from: Richard Abel & Company, Inc., P. O. Box 4245, Portland, Oregon 97208.

Encyclopedia of Paleoherpetology: Part 15. Ornithischia. Edited by Roadney Steel. 1969. (in English). 90 pages. 24 illustrations. Paperbound. Available from Richard Abel & Company, Inc. (see above for address).

The Tailed Amphibians of Europe by J. W. Steward. 1969. cloth. Available after June 1969 from: Wheldon & Wesley, Ltd., Lytton Lodge, Codicote, Hitchin, Herts.

Herpetologica Mexicana by A. F. A. Weigmann. Berlin, 1834. A 1969 reprint by the Society for the Study of Amphibians and Reptiles. Available to members, before publication, for $3.00. Post-publication price is $6.00. Persons desiring to obtain this important work should address their orders to: Henri C. Seibert, SSAR Publications Secretary, Department of Zoology, Ohio University, Athens 45701.

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TREASURER'S REPORT - 1968

Income		
Regular U.S. memberships		$ 1044.00
Regular foreign memberships		62.00
Sustaining memberships		660.00
Contributing memberships		90.00
Institutional subscriptions		390.00
Sale of author reprints		410.68
Back issues & advance facsimile sales		1529.45
Donations:		
Journal of Herpetology fund	$ 340.00	
Facsimile Reprint fund	375.00	
Herpetological Review fund	337.40	1052.40
Annual meeting receipts		1294.00
Refund of annual meeting advance		23.34
Sale of annual meeting group photographs		29.00
		$ 6584.87
Expenditures		
Journal of Herpetology Volume 1(1-4) partial payment		$ 300.00
Journal of Herpetology Volume 2(1-2)		973.45
Journal of Herpetology Volume 2(3-4)		1049.44
Table of Contents & Index to OHS Journal Volume 5		59.63
Chang facsimile reprint		542.60
Boulenger #6 facsimile reprint		208.33
Boulenger #7 facsimile reprint		195.68
Tschudi facsimile reprint		126.29
Herpetological Review #2		187.67
Herpetological Review #3		127.12
Herpetological Review #4		157.17
Annual meeting expenses		1170.55
Cost of annual meeting group photographs		23.55
Annual meeting advance		50.00
Postage		520.83
Secretarial assistance		65.90
Purchase (part) & service of Society IBM typewriter		182.33
Final payment of 1967 annual meeting expenses		246.00
Stationary & envelopes		239.65
Transferred to Athens Ohio savings account		48.00
Bad checks		31.00
Long distance telephone calls		21.10
Bank charges		8.86
		$ 6535.15
Assets 1968		
Life membership fund as of 31 Dec 1967	$ 275.75	
1968 life membership income	275.00	
1968 life membership interest	19.24	
		$ 569.99
1968 Income	$ 6584.87	
1968 Expenditure	−6535.15	
		$ 49.72
Total assets as of 1 January 1969		$ 619.71

Joseph T. Collins, Secretary-Treasurer
Society for the Study of
Amphibians and Reptiles

LICHT,PAUL
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PHYSIS 28(76):127-134, 1 FIG. (PORT, ENG SUMM)

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COMMUNIST CHIN SCI ABSTR (2):204. (TITLE ONLY)

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BIOCHIM BIOPHYS ACTA 163(3):424-426, 3 FIG.

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1968 FROG CALLS AND THE SPECIES PROBLEM
AUST ZOOL 14(3):259-264, 1 FIG., 3 PL.

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1968 AN EXPERIMENTAL EVALUATION OF PREMATING ISOLATION IN THE HYLA EWINGI COMPLEX (ANURA : HYLIDAE)
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EXP CELL RES 52(2-3):555-564, 6 FIG.

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VIRGINIA J SCI (N.S.) 19(3):183. (ABSTR)

WOLSTENHOLME,DAVID R. AND IGOR B.DAWID
1968 A SIZE DIFFERENCE BETWEEN MITOCHONDRIAL DNA MOLECULES OF URODELE AND ANURAN AMPHIBIA
J CELL BIOL 39(1):222-228, 7 FIG., 1 TAB.

WRIGHT,BRUCE S.
1968 INDIA'S KEOLADEO GHANA SANCTUARY
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WU,JUI-MIN AND HSIU-MEI CHENG
1968 TEETH OF ENHYDRIS CHINENSIS (GRAY)
COMMUNIST CHIN SCI ABSTR (2):215.

WURTMAN,RICHARD J., JULIUS AXELROD, ELLIOT S.VESELL AND GRIFF T.ROSS
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ENDOCRINOLOGY 82:584-590.

--- Y ---

YAMAGUCHI,TOSHIO
1968 EFFECTS OF CAFFEINE ON TWITCH CONTRACTION ELICITED IN FROG'S SKELETAL MUSCLE FIBRES IMMERSED IN OSMOTICALLY ANOMALOUS MEDIA
J FAC SCI HOKKAIDO UNIV SER VI 16(3):324-338, 7 FIG., 2 TAB.

YEPEZ,AGUSTIN FERNANDEZ
1968 LA TORTUGA ARRAU
EL LAGO 2(10):148-151, ILL.

YIAMOUYIANNIS,JOHN A. AND JOEL A.DAIN
1968 UDP-GALACTOSE:N-ACETYLGALACTOSAMINYL-(N-ACETYLNEURAMINYL)-GALACTOSYL-GLUCOSYL-CERAMIDE TRANSFERASE ACTIVITY IN ADULT FROG BRAIN
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YIN,YUAN-HUNG, WEI-CHIN CHIANG AND MAO-CH'EN YANG
1968 A PRELIMINARY SURVEY OF REPTILIA IN SHANSI PROVINCE
COMMUNIST CHIN SCI ABSTR (2):207-209.

YNTEMA,C.L.
1968 A SERIES OF STAGES IN THE EMBRYONIC DEVELOPMENT OF CHELYDRA SERPENTINA
J MORPHOL 125(2):219-252, 2 FIG., 10 PL.

YOUNG,R.S. AND J.W.TREMOR
1968 WEIGHTLESSNESS AND THE DEVELOPING FROG EGG, IN, LIFE SCIENCES AND SPACE RESEARCH. EIGHTH INTERNATIONAL SPACE SCIENCE SYMPOSIUM, LONDON, 1967. NORTH HOLLAND PUBL., AMSTERDAM (FROM PREPRINT).

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1968 THE ENVIRONMENTAL EFFECT ON THIOUREA-INDUCED SEX TRANSFORMATION IN RANA CATESBEIANA TADPOLES
BULL INST ZOOL ACAD SINICA 6(1):11-15, 7 FIG., 3 TAB.

--- Z ---

ZALIK,SARA EISENBERG AND ISAURA MEZA
1968 IN VITRO CULTURE OF THE REGENERATING LENS
NATURE 217(5124):179-180, 6 FIG.

ZIMKA,JERZY
1968 THE FROG AS A SECONDARY ORDER PREDATOR IN THE MACROFAUNA COMMUNITIES OF THE BOTTOM OF THE FOREST
EKOL POL SER B 14(4):357-362. (POL, ENGL ABSTR)

ZWEIFEL,RICHARD G.
1968 RANA BOYLII
CAT AMER AMPHIBIANS REPTILES 71, 1 MAP.

■ ■ ■ ■ ■

a sample index

WE HAVE BEGUN TO INDEX THE LISTED TITLES BY SUBJECT, GEOGRAPHY, AND TAXONOMIC ARRANGEMENT, AND EXPECT TO HAVE THIS PUNCH-CARD SYSTEM FULLY OPERATIVE BY THE END OF 1969. ALL OF THE INDEX-TERMS ARE HIERARCHIAL IN ARRANGEMENT -- ALLOWING GENERAL QUESTIONS, FOR EXAMPLE ON THE NATURAL HISTORY OF NEARCTIC AMPHIBIANS, OR ON SUBJECTS AS SPECIFIC AS THE HISTOLOGY OF THE PINEAL ORGAN OF GREEK SPECIES OF LACERTA.

IT IS NOT OUR INTENTION TO PUBLISH SUCH A CROSS-INDEX ON A REGULAR BASIS. THE REQUIREMENTS OF INDIVIDUAL WORKERS ARE TOO VARIED TO FULFILL ALL OF THEM ADEQUATELY BY A GENERAL INDEX. HOWEVER, THE FACILITIES FOR GETTING AT THIS MATERIAL WILL BE READILY AVAILABLE HERE, AND SHOULD GAIN IN USEFULNESS TO ALL AS PAPERS ARE ADDED TO THE SYSTEM THROUGH THE YEARS.

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AN INDEX TO A VARIED SAMPLE OF THE PAPERS IN THE CURRENT LIST IS PRESENTED BELOW.

THE FIRST LIST OF CITATION-CODES IS OF THOSE TITLES WHICH PERTAIN TO PALEARCTIC AMPHIBIANS AND REPTILES.

```
BRUNS 968ARD:  31PWIMI  YH N  FR RS SE CO   758COL04
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768COR06
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   833ELA03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   826MAL05
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   758COL04
MISHS 968SIF:  52POJ    VVBNAPAD RS SE CO   853DIN04
MISHS 968SIF:  52POJ    VVBNAPAD RS SE CO   833ELA03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768COR06
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   758COL04
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   826MAL05
EBENT 968FIB: 155PWNSW  YS NZRAD RS SE CO   768NAT03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768NAT03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768NAT03
THIOJM968ERM: 179PWF    WVBNAFAD RS SA LA   758LAC04
TELFSR968SFL:  52POJ    DL NC AC RS SA LA   802TAC08
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA LA   758LAC04
TELFSR968SFL:  52POJ    XTANC AC RS SA LA   802TAC08
BECKP 968RBA:  43PWF    YS N  FS RT CR TE EM806EMY01
EBENT 968FIB: 155PWNSW  YS NZRAD RS SE VI VI768VIP03
BECKP 968RBA:  43PWF    YS N  FS RS SE VI VI768VIP03
MISHS 968SIF:  52POJ    VVBNAPAD RS SE VI CR758CR005
BRUNS 968ARD:  31PWIMI  YH N  FR RS SE VI VI768VIP03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE VI VI768VIP03
TEREPV968AAA:   1P R    YV NZ FC R
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA GE GE817HEM09
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA GE GE828PHY11
THIOJM968ERM: 179PWF    WVBNAFAD RS SA AN   758ANG03
LEFFG 967PCE: 269PMAL   XAPAG IP RT
HUBEJ 968UGP:1001P      URGAU AD RS SA LA   758LAC04
ISHIS 968PBJ:  48POJ    SVCAG AD RS SA LA   802TAC08
HOFFR 9680SC:1028PW   PCSVNAG AC RS SA AI
HOFFR 9680SC:1028PW   PESVNAG AC RS SA NE
BRUNS 968ARD:  31PWIMI  YH SD FP RS SA GE GE817HEM09
BRUNS 968ARD:  31PWIMI  YH SD FP RS SA GE GE828PHY11
BRUNS 968ARD:  31PWIMI  YH SD FP RS SA LA   758LAC04
BRUNS 968ARD:  31PWIMI  YH SD FP RS SE CO   758COL04
BRUNS 968ARD:  31PWIMI  YH SD FP RS SE VI VI768VIP03
PETIA 968URP:  70PW     EE AU AD RS SA AN   758ANG03
ELDAAL968BTE: 237P      YS B  AD RT CR TE BA869MAU05
ELDAAL968BTE: 237P      YS B  AD RT CR TE EM806EMY01
BRUNS 968ARD:  31PWIMI  YH SD FP RT CR TE TE758TES04
BECKP 968RBA:  43PWF    YS N  FS RT CR TE TE758TES04
PIEAC 968PSM:2452P      DACEO AD RT CR TE TE758TES04
BRUNS 968ARD:  31PWIMI  YH N  FR RT CR TE TE758TES04
TEREPV968AAA:   1P R    YV NZ FC A
KANAI 968EFD:  51POJ    YS AX AC AC CR HY   838HYN05
KANAI 968EFD:  51POJ    YS NZ AD AC CR HY   838HYN05
ASSES 968NAP:  261P     UFEEDIEC AC SA SA   830PLE08
RADEG 968SAL:  345PW    YS N  PP AC SA SA   768SAL07
EBENT 968FIB: 155PWNSW  YS NZRAD AC SA SA   815TRI05
MATEC 967EAI:  369PWBRU EP NG EH AC SA SA   815TRI05
BURNP 968MN :  566P     YS HC PP AC SA SA   815TRI05
DESSJC968RRI:1642P      SALNGRER AC SA SA   815TRI05
FALKG 968CCP:  647P     OVRPE AX AS
SAIOM 968MSP:  811POJ   MSAPB AD AS
PEREVV968AUL:  726P     XT PL EC AS
CAMPH 967SNL:  101PMEG  XAPAG ID AS
TAGLV 968DRF:   81P     RPLPE AD AS
EBENT 968FIB: 155PWNSW  YS NZRAD AS     BU   768BUF01
MATEC 967EAI:  369PWBRU EP NG EH AS     BU   768BUF01
PETRD 968FOC:  327PW    UF PH AD AS     BU   768BUF01
HEUSH 968LER:  257PWCSW YS BR AD AS     BU   768BUF01
MICHMI968HLR:  235PM    XRANGRAD AS     BU   768BUF01
NADEP 968AED:  651PW    XILNYMEH AS     BU   768BUF01
BRUNS 968ARD:  31PWIMI  YH N  FR AS     DI   837DIS09
BRUNS 968ARD:  31PWIMI  YH SD FP AS     DI   837DIS09
MATSJ 968UPC:  757POJ   ICPAU PA AS     RA   758RAN01
SOTEC 968PPS:  294PW    NPAAH ES AS     RA   758RAN01
GLASMJ968QSR:  327P     MSAAHCAD AS     RA   758RAN01
EBENT 968FIB: 155PWNSW  YS NZRAD AS     RA   758RAN01
FOX H 968MCT:  107P     N  NG EH AS     RA   758RAN01
HAZEE 968FIR:  130PWE   YS NYLPQ AS     RA   758RAN01
MATEC 967EAI:  369PWBRU EP NG EH AS     RA   758RAN01
SCHOB 968WUR:  557P     NCSNGRAD AS     RA   758RAN01
YAMAT 968ECT:  324POJ   MSAPP EC AS     RA   758RAN01
SUCHG 968SAP:  413PW    CL PE AD AS     RA   758RAN01
NATOIV968EPA:1237PW     UXBPMWEC AS     RA   758RAN01
NATOIV968EPA:1237PW     IS PMWEC AS     RA   758RAN01
BROTJ 9681HF:  299PW    MS PBEAD AS     RA   758RAN01
COLOF 968MSP:  205P     NCSPE AX AS     RA   758RAN01
DONNKO968VAR:   59P     OVRPPLAX AS     RA   758RAN01
SIMKK 968CCM:  627P     YS PM AX AS     RA   758RAN01
FALKG 968PEP:  627P     OVRPE AX AS     RA   758RAN01
HONGSK968SCA:  439POK   IS PCHAC AS     RA   758RAN01
GEBEG 968CCF:  296P     MS PCDAX AS     RA   758RAN01
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THIS LIST IS REDUCED GREATLY BY RESTRICTING IT TO THOSE TITLES THAT REFER TO PALEARCTIC REPTILES.

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THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   826MAL05
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   833ELA03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768COR06
BRUNS 968ARD:  31PWIMI  YH N  FR RS SE CO   758COL04
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   758COL04
MISHS 968SIF:  52POJ    VVBNAPAD RS SE CO   853DIN04
MISHS 968SIF:  52POJ    VVBNAPAD RS SE CO   833ELA03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768COR06
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   758COL04
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   826MAL05
EBENT 968FIB: 155PWNSW  YS NZRAD RS SE CO   768NAT03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768NAT03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768NAT03
TELFSR968SFL:  52POJ    DL NC AC RS SA LA   802TAC08
THIOJM968ERM: 179PWF    WVBNAFAD RS SA LA   758LAC04
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA LA   758LAC04
TELFSR968SFL:  52POJ    XTANC AC RS SA LA   802TAC08
BECKP 968RBA:  43PWF    YS N  FS RT CR TE EM806EMY01
EBENT 968FIB: 155PWNSW  YS NZRAD RS SE VI VI768VIP03
BECKP 968RBA:  43PWF    YS N  FS RS SE VI VI768VIP03
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THIOJM968ERM: 179PWF    WVBNAFAD RS SE VI VI768VIP03
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BRUNS 968ARD:  31PWIMI  YH N  FR RS SA GE GE828PHY11
THIOJM968ERM: 179PWF    WVBNAFAD RS SA AN   758ANG03
BECKP 968RBA:  43PWF    YS N  FS RT CR TE TE758TES04
TELFSR968SFL:  52POJ    DL NC AC RS SA LA   802TAC08
BRUNS 968ARD:  31PWIMI  YH N  FR RT CR TE TE758TES04
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IF ONLY THOSE PAPERS REFERRING TO THE NATURAL HISTORY OF PALEARCTIC REPTILES ARE DESIRED, THE LIST IS FURTHER REDUCED.

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THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   826MAL05
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   833ELA03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768COR06
BRUNS 968ARD:  31PWIMI  YH N  FR RS SE CO   758COL04
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   758COL04
MISHS 968SIF:  52POJ    VVBNAPAD RS SE CO   853DIN04
MISHS 968SIF:  52POJ    VVBNAPAD RS SE CO   833ELA03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768COR06
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   758COL04
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   826MAL05
EBENT 968FIB: 155PWNSW  YS NZRAD RS SE CO   768NAT03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768NAT03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768NAT03
THIOJM968ERM: 179PWF    WVBNAFAD RS SA LA   758LAC04
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA LA   758LAC04
TELFSR968SFL:  52POJ    XTANC AC RS SA LA   802TAC08
BECKP 968RBA:  43PWF    YS N  FS RT CR TE EM806EMY01
EBENT 968FIB: 155PWNSW  YS NZRAD RS SE VI VI768VIP03
BECKP 968RBA:  43PWF    YS N  FS RS SE VI VI768VIP03
MISHS 968SIF:  52POJ    VVBNAPAD RS SE VI CR758CR005
BRUNS 968ARD:  31PWIMI  YH N  FR RS SE VI VI768VIP03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE VI VI768VIP03
TEREPV968AAA:   1P R    YV NZ FC R
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA GE GE817HEM09
BRUNS 968ARD:  31PWIMI  YH N  FR RS SA GE GE828PHY11
THIOJM968ERM: 179PWF    WVBNAFAD RS SA AN   758ANG03
BECKP 968RBA:  43PWF    YS N  FS RT CR TE TE758TES04
TELFSR968SFL:  52POJ    DL NC AC RS SA LA   802TAC08
BRUNS 968ARD:  31PWIMI  YH N  FR RT CR TE TE758TES04
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A FURTHER RESTRICTION -- TO THE REPTILES OF FRANCE -- CAN BE MADE.

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THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   826MAL05
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   833ELA03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768COR06
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   758COL04
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768COR06
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   758COL04
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   826MAL05
THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768NAT03
BECKP 968RBA:  43PWF    YS N  FS RS SE CO   768NAT03
THIOJM968ERM: 179PWF    WVBNAFAD RS SA LA   758LAC04
BECKP 968RBA:  43PWF    YS N  FS RT CR TE EM806EMY01
BECKP 968RBA:  43PWF    YS N  FS RS SE VI VI768VIP03
THIOJM968ERM: 179PWF    WVBNAFAD RS SE VI VI768VIP03
THIOJM968ERM: 179PWF    WVBNAFAD RS SA AN   758ANG03
BECKP 968RBA:  43PWF    YS N  FS RT CR TE TE758TES04
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AND, IF WE ARE INTERESTED ONLY IN PREDATION ON FRENCH POPULATIONS OF NATRIX, ONLY ONE PAPER REMAINS.

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THIOJM968ERM: 179PWF    WVBNAFAD RS SE CO   768NAT03
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THE FULL CITATION IS:

THIOLLAY,J.-M.
1968 ESSAI SUR LES REPACES DU MIDI DE LA FRANCE
DISTRIBUTION - ECOLOGIE
ALAUDA 36(3):179-189.

*** IT IS NOT NECESSARY, OF COURSE, TO APPROACH A PARTICULAR PROBLEM IN THIS STEP-WISE FASHION. THIS ONE COULD HAVE BEEN APPROACHED DIRECTLY BY IMMEDIATE USE OF SPECIFIC TERMS IN EACH OF THE THREE (SUBJECT, GEOGRAPHIC, AND TAXONOMIC) INDICES.

FUTURE SSAR MEETINGS

1969 - SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE

1970 - UNIVERSITY OF MISSOURI, KANSAS CITY

Current Herpetological Titles, V.

By H. G. Dowling, Itzchak Gilboa, and Irene Palser

GENERA OF REPTILES, American Museum of Natural History, New York, New York 10024.

****

THIS FIFTH LIST OF CURRENT HERPETOLOGICAL TITLES (SEE HERPETOLOGICAL REVIEW NUMBERS 2,3,4 & 5 FOR PREVIOUS LISTS) INCLUDES ADDITIONAL TITLES THAT HAVE COME IN DURING THE PERIOD 1 NOVEMBER 1968 THROUGH 1 FEBRUARY 1969. AS BEFORE, A FEW TITLES HAVE BEEN OBTAINED FROM SECONDARY SOURCES, BUT THESE MAKE UP LESS THAN FIVE PER CENT OF THE TITLES LISTED. LIKE THE PREVIOUS LISTS, THIS ONE IS PHOTO-OFFSET REPRODUCTION FROM COMPUTER PRINTOUT.

THE VAST MAJORITY OF LISTED PAPERS IS IMMEDIATELY AVAILABLE TO US. WE ARE BASED AT ONE OF THE GREATEST (AND LIKELY THE MOST ACCESSIBLE) HERPETOLOGICAL LIBRARIES OF THE WORLD. WE DO NOT ANTICIPATE BEING READY TO ACT AS A BIBLIOGRAPHIC SERVICE FOR ANOTHER YEAR. HOWEVER, IF YOU ARE REALLY STUCK FOR A REFERENCE, LET US KNOW: WE WILL SEE WHAT WE CAN DO.

FUTURE: TO THIS DATE THE CURRENT LIST OF TITLES HAS BEEN NO MORE THAN THAT. HOWEVER, WE HAVE BEGUN TO CROSS-INDEX THE 1968 LITERATURE FOR ACCESS THROUGH TAXONOMIC, GEOGRAPHIC, AND SUBJECT AVENUES. WE DO NOT ANTICIPATE PUBLISHING THIS INDEX BUT INSTEAD ARE ATTEMPTING TO COORDINATE OUR EFFORTS WITH BIOLOGICAL ABSTRACTS AND ZOOLOGICAL RECORD. BOTH OF THESE INSTITUTIONS HAVE INDICATED AN INTEREST IN COORDINATING THE INFORMATION OBTAINED HERE WITH THAT DERIVED FROM THEIR OWN SOURCES AND WE ARE STILL EXPLORING THE VARIOUS POSSIBILITIES.

ACKNOWLEDGMENTS: THIS LIST WAS PREPARED WITH THE AID OF THE HERPETOLOGY DEPARTMENT AND THE LIBRARY OF THE MUSEUM, AND THE DEPARTMENT OF ZOOLOGY AND THE COMPUTER LABORATORY OF THE UNIVERSITY OF RHODE ISLAND. WE ARE ESPECIALLY GRATEFUL FOR THE HELP OF JAMES E. BRADLEY AND HARLAN S. HERSEY OF THE COMPUTER LABORATORY. SEVERAL COLLEAGUES HAVE AIDED BY BRINGING ADDITIONAL LITERATURE TO OUR ATTENTION. FORMOST AMONG THESE IS JAMES. A. PETERS, WHO HAS FORWARDED NEARLY TWO HUNDRED REPRINTS TO US FOR INCLUSION. OTHER VALUABLE AID HAS BEEN PROVIDED BY GEORGE J. JACOBS (GOVERNMENT PUBLICATIONS) AND DAVID B. WAKE (OBSCURE JOURNALS).

TOBY F. SHAMAN HAS BECOME AN INTEGRAL COG IN THE MACHINERY OF THE PROJECT, WHILE RICHARD G. ZWEIFEL AND MARGARET S. SHAW, ALSO OF THE DEPARTMENT OF HERPETOLOGY, HAVE AIDED THE PROJECT IN MANY SPECIAL WAYS. NAO SAITO AND ROBERT J. WINTER OF THE DEPARTMENT OF ICHTHYOLOGY, HAVE BEEN VERY HELPFUL WITH TRANSLATIONS FROM ORIENTAL AND SLAVIC JOURNALS. WE ARE GRATEFUL FOR ALL OF THIS HELP. THE PROJECT IS SUPPORTED BY THE NATIONAL SCIENCE FOUNDATION (NSF GN-707).

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--- A ---

ABIR,ARJEH
1968 VISIT IN A SNAKE FARM
BAMACHANEH 22(15):22-23, ILL. (HEBREW)

ADITHIYA,L.A.
1968 A POLON-HEERALUVA FROM WILPATTU
LORIS 11(3):160-162, 1 FIG.

ADLER,KRAIG
1968 TURTLES FROM ARCHEOLOGICAL SITES IN THE GREAT LAKES REGION
MICH ARCHAEOL 14(3-4):147-163, 6 FIG., 1 TAB.

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1968 ADAPTATION TO TEMPERATURE IN HEART RATES OF SALAMANDER LARVAE BEFORE CARDIAC INNERVATION
AMER J PHYSIOL 215(1):124-126, 3 FIG.

ADOLPH,E.F. AND J.M.FERRARI
1968 REGULATION OF HEART RATE BEFORE CARDIAC INNERVATION IN SALAMANDER LARVAE
AMER J PHYSIOL 215(4):753-756, 3 TAB.

ALEXANDER,CHARLES E. AND WALTER G.WHITFORD
1968 ENERGY REQUIREMENTS OF UTA STANSBURIANA
COPEIA 1968(4):678-683, 1 FIG., 3 TAB.

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J CELL BIOL 39(2):5. (ABSTR)

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CONSERV VOLUNTEER 31(182):2-21, ILLUS.

ALLEN,E.ROSS
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BULL ROSS ALLEN REPTILE INST (79):1-6.

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AMER J PHYSIOL 215(6):1305-1309, 2 FIG., 6 TAB.

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IUCN PUBL (N.S.) 10:498-505.

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1968 RHYACOTRITON AND R. OLYMPICUS
CAT AMER AMPHIBIANS REPTILES 68, 1 MAP.

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1968 PREOVULATORY CHANGES IN THE ULTRASTRUCTURE OF THE FROG OVARY
J CELL BIOL 39(2):5-6. (ABSTR)

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1968 NERVE GROWTH FACTOR (NGF) FROM SNAKE VENOM. GEL FILTRATION PATTERNS OF CRUDE VENOMS
J CHROMATOGR 36(4):535-537.

ANNAMALAI,P.M.
1968 THE MORPHOLOGY AND HISTOLOGY OF THE OVARY, THE CORPUS LUTEUM AND THE TESTIS OF MABUYA CARINATA BOULENGER
J ZOOL SOC INDIA 18(1-2):19-28, 11 FIG.

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1968 ALGUNAS ACTIVIDADES DE LA ESTACION BIOLOGICA CHARLES DARWIN (GALAPAGOS)
CIENC NATUR 11(1):63-64.

ANON
1968 ARAMCO HANDBOOK: OIL AND THE MIDDLE EAST (REV. ED)
ARABIAN AMERICAN OIL CO., DHAHRAN, SAUDI ARABIA.
279 P., ILL. (SOME COL.)

ANON
1968 THE AMPHIBIA OF LONG ISLAND
SANCTUARY (LONG ISL N Y) 1-19, ILL. (MIMEO)

ANON
1968 ALDABRA TORTOISES
KINGFISHER 4(1):21. (ABSTR)

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1968 ALLIGATORS THRIVE ON ATOMIC HEAT
SCI NEWS 94(20):495.

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1968 BIG SEA TURTLE AT AQUARIUM
VA(NCOUVER) AQUAR NEWSLETTER 12(10):1, ILL.

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ORYX 9(3):324.

ANON
1968 COLOR PHOTO OF PYXIS ARACHNOIDES
ZOONOOZ 41(10):19.

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herpetological REVIEW

NUMBER 6 / MARCH 1969

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles.

SEE PAGE 4 OF THIS ISSUE

FOR DUES INFORMATION

HERPETOLOGICAL REVIEW

Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor.

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Herpetological Review

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EDITOR - JOSEPH T COLLINS

•CONTENTS

3 First National Biological Congress for the U. S. A., by William D. McElroy

4 Increase in SSAR dues for 1969

4 New Books and Reprints

4 Members Desiderata

4 New Herpetological Society Formed

5 Hampton Wildman Parker (1897-1968), by James C. Battersby

6 Fred Ray Cagle (1915-1968), by Joseph T. Collins

6 Herpetological Publications for sale

7 Current Herpetological Titles V: 1968-1969, by H. G. Dowling, Itzchak Gilboa and Irene Palser

30 Current Herpetological Titles: A Sample Index

31 Future SSAR Meetings

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FIRST NATIONAL BIOLOGICAL CONGRESS FOR THE U.S.A.

The Governing Board of the American Institute of Biological Sciences approved on 1 September 1968 a resolution to hold National Biological Congresses in 1970, 1971 and 1972. The first Congress will be held in Detroit, Michigan, 6-10 November, 1970.

The world is confronted by a number of threats of unprecedented magnitude. The rapid growth in human population has raised the spectre of a worsening deficit in important world resources. Food, already in short supply, cannot for long be produced in the quantity and at levels of quality essential to the maintenance of our peoples. Air and water, once considered inexhaustible reservoirs, are becoming polluted at an alarming rate. If these and similar problems do not find solutions now, currently existing generations will live with a number of disastrous consequences.

No longer can man ignore these major crises that confront our cities and the nation as a whole.

Biologists must seek solutions to the problems which face us. The decision to initiate a series of National Biological Congresses is a practical and immediate step by biologists to marshall the unique skills and sophisticated techniques of this field of science.

The Congresses will be concerned with Social, Education and Scientific aspects of these problems. The morning sessions will be devoted to interdisciplinary symposia covering the major scientific advances in all areas of Biology. National and International leaders in the biomedical sciences will be invited to participate in these symposia.

Afternoon sessions will be devoted to papers contributed by biologists active in specific research. Progress in areas of biology ranging from molecular, genetic and developmental biology to evolutionary, ecological and environmental sciences will be reviewed. Invitations will be extended to younger scientists to contribute original research papers that will shed additional light on the subjects covered by the major symposia.

Special evening programs, open to the public, will be designed to provide a forum in which the inter-relationships of biology, technology, society and public affairs are considered. Invitations will be extended to local, state and national leaders to participate in these public meetings. Among the topics to be considered for whose solution biological knowledge is vital are water and air pollution, pest control, population pressures, community health, food quality and the effects of drugs on human development and behavior.

Educational and scientific programs will be arranged for local high school and college students who are interested in a career in the biological-medical sciences. In addition to lectures by outstanding scientists, there will be special programs by leading science counsellors who will describe career opportunities in biology.

Exhibits by book publishers and suppliers of scientific equipment will be of interest to scientists. In addition, organized tours for students and the general public are planned in order to give them an opportunity to see the current "tools" used by the biologists.

WILLIAM D. McELROY, President, American Institute of Biological Sciences. (from Biological Abstracts, Volume 49(19): October 1, 1968).

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SOCIETY'S DUES ARE INCREASED FOR 1969

At the Society's eleventh annual meeting the Board of Directors voted to increase dues for calendar 1969 as follow: Regular member (U. S. and Canada) - $6. 00; Foreign member - $5. 00; Sustaining member - $8. 00; and institutional subscription - $10. 00. Contributing membership and Life membership remain the same at, respectively, $15. 00 and $100. 00.

New Books & Reprints

Batrachia and Reptilia of Costa Rica by Edward D. Cope. 1967 reprint. Prefaced by Jaime Villa. Available for $1. 50 from: Departamento de Biologia, Universidad de Costa Rica, Ciudad Universitaria, Costa Rica.

Amphibien und Reptilien: Katalog der Subfamilien und höheren Taxa mit Nachweis des ersten Auftretens by Oskar Kuhn. 1967. Available for $11. 00 from: Richard Abel & Co., Inc., P. O. Box 4245, Portland, Oregon 97208.

Snakes: The Keeper and the Kept by Carl Kauffeld. 1968. Available for $5. 95 from Doubleday.

Herpetologica Mexicana by A. F. A. Wiegmann. Berlin, 1834. A 1969 reprint by the Society for the Study of Amphibians and Reptiles. Available for $6. 00 from: Henri C. Seibert, SSAR Publications Secretary, Department of Zoology, Ohio University, Athens, Ohio 45701.

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MEMBERS DESIDERATA

Robert M. Deems, 13 Lawnside Drive, Trenton, New Jersey 08638, wishes to obtain specimens of Sceloporus cyanogenys.

Wayne Busby, 82 - 29th Street, Toronto 14, Ontario, Canada, wishes to obtain adresses of herpetological societies in England and Australia.

NEW HERPETOLOGICAL SOCIETY FORMED

President Howard Lawler announces the formation of the Tennessee Herpetological Society at Nashville. The THS issues a monthly mimeographed bulletin devoted to surveying the herpetofauna of Tennessee. Persons wishing to join the THS may contact: Renee Lawler, Secretary-Treasurer, 1505 Acklen Avenue, Nashville, Tennessee 37212.

HAMPTON WILDMAN PARKER

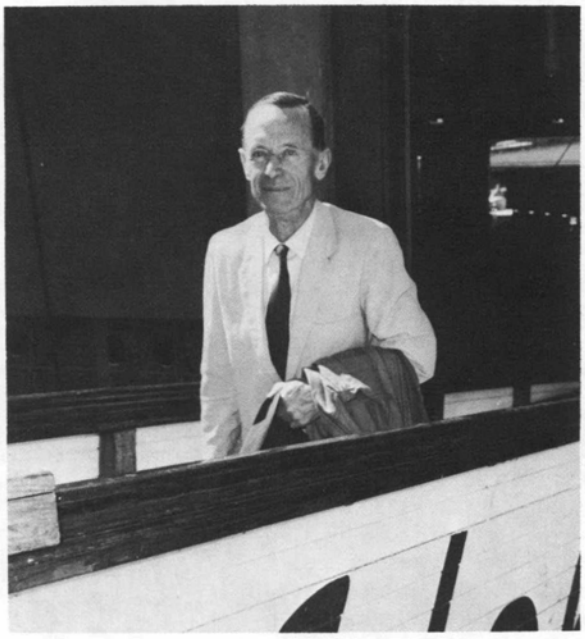
Dr. H. W. Parker, C.B.E., D.Sc., B.A., F.L.S., F.Z.S. (1897 - 1968) was born at Giggleswick, Yorkshire, the elder son of Stephen Parker, a schoolmaster, and Bertha Leonora née Hampton. He married in 1924 Nora, daughter of Frederick William Whatling, property developer, and Rebecca, née Newman.

He received his early education in Yorkshire and at Christ's Hospital. In the year 1919, having gained a Natural Science Scholarship, he went up to Cambridge University where at Selwyn College he received a first class degree in zoology, chemistry, botany, and the college Prize Bachelors. He also distinguished himself in sport, winning his college colours in athletics, rugby and rowing. During the 1914 - 1918 war he enlisted in the Army, was commissioned in the Duke of Wellington's Regiment and was wounded on service in France.

His connection with the British Museum (Natural History) London began in 1923, when he was appointed as Assistant Keeper in charge of the Amphibia and Reptilia Section. For a short period during the 1939 - 1945 war he was seconded to the Admiralty where he was a Temporary Naval Store Officer. After returning to the museum he was, in 1947, promoted to be Keeper of the Department of Zoology. He retired from the museum service in 1957.

H. W. Parker wrote extensively on the systematics of his groups from the time he entered the museum and he was still engaged in writing shortly before his untimely death. He had a clear, logical mind and the gift of deep concentration; his published works show an increasing maturity, depth of understanding and a new approach to systematics. He was a founder member and a secretary of the Systematics Association and also served for a short time as Honorary Treasurer. Among his most important works are the monographs on the Australian Leptodactylid frogs, Frogs of the family Microhylidae, and on lizards and snakes of Somaliland.

During the period in the museum, his opinions and services were in constant demand both by colleagues and younger workers and his time was freely given. Correspondence was world-wide and his replies, meticulous in attention to detail and carefully considered, were much appreciated. Appreciation was shown particularly by American colleagues and he was made an Honorary Foreign Member of the American Society of Ichthyologists and Herpetologists. In 1949 the University of Leiden awarded him a Doctorate of Science. At the examination ceremony the audience had unbounded admiration for his knowledge and ability to communicate his thoughts. Some of his scientific opinions and published works may, of course, invite some criticism, but will receive more praise. The quality of his work is obvious and it is as a scientist that he will be more widely remembered. He was a member of Council and of several committees of the Zoological Society of London and a Council member of the Linnean Society for many years.



There are other less known facets of his character. H. W. Parker was a competent administrator and during his ten years as Keeper of Zoology this became clear. His efforts were directed mainly towards rehabilitation and reconstruction after the upsets of the war. A difficult period, from which he emerged scarred but victorious and for which retired and present staff have much to thank him. He had also a breadth of mind which allowed him to delegate responsibilities and to give and sustain support from a distance. A practical side of his abilities also emerged. Soon after he began his museum service, transfer of the collections of preserved amphibia and reptilia from the old store-rooms to a new building took place, when he was not slow in doffing his coat and taking a share in some of the more physically arduous and less interesting sides of museum management. This ability was again brought into use during the early period of the 1939 - 1945 war in making preparation for the protection of the staff and the building of safety rooms. With carpenter's tools in his hand in place of the usual calipers and scalpel, H. W. Parker was a joy to behold. He had an integrity of mind and purpose which coloured all his endeavours and a personality

that commanded loyalty and a deep respect. His love of the sea was apparent in the care given to his sailing boats, one named Caretta and another Black Bottom. He was a competent navigator and took many happy and eventful voyages across the English Channel and into the inland waters of the continent of Europe.

A catalogue of published works and a recital of some achievements cannot alone provide an adequate picture of his personality. H. W. Parker disliked the banalities of small talk and was naturally modest and retiring. A close association of over 30 years allows me to feel and to say sincerely, that I am proud to have known him and I regret his passing.

He was aged 71 years and is survived by his wife.

JAMES C. BATTERSBY

FRED RAY CAGLE (1915 - 1968)

On 8 August 1968, Dr. Fred R. Cagle died at the age of 53. Dr. Cagle was currently professor of biology and Vice-President of Tulane University, New Orleans. He received his bacculaureate degree in 1937 at Southern Illinois Normal University, and his Master's degree at the University of Michigan in 1938. He served as a university fellow (1941-43) and Rackham fellow (1942-43) at Michigan where he received his doctorate degree in zoology in 1943.



DR. FRED R. CAGLE

After serving as Captain in the armed forces from 1943 to 1946, he accepted a position as associate professor of zoology at Tulane University. In 1949 he was elevated to professor of zoology. In 1959 he was appointed research coordinator at Tulane University until his elevation to Vice-President of that institution.

Dr. Cagle's research was varied and included such areas as growth of reptiles, temperature relationships in poikilothermic vertebrates, natural history and systematics of reptiles, and education. He also expressed deep interest and concern over the state of biological communication in this country. He served as editor of Copeia, The American Midland Naturalist, and Biological Abstracts, and was one of the founders of the Conference of Biological Editors.

The list of societies and organizations of which Dr. Cagle was a member is lengthy; some of the more important ones were the Society of Systematic Zoology, American Society of Ichthyologists and Herpetologists, Society of Mammalogists, Wilson Ornithological Club, Society for the Study of Evolution, the Wildlife Society, and the Cooper Ornithological Society. In addition, Dr. Cagle was one of the initial sustaining members of the Society for the Study of Amphibians and Reptiles.

JOSEPH T. COLLINS, Museum of Natural History, University of Kansas, Lawrence 66044

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OF INTEREST TO PERSONS WISHING TO BUILD A HERPETOLOGICAL LIBRARY . . . . . .

The following books and reprints are available at the prices listed. Checks should be made payable to Joseph T. Collins, and mailed to: Museum of Natural History, University of Kansas, Lawrence 66044. Upon receipt of payment, books will be forwarded postpaid to purchasers.

Klassen und Ordnungen des Thier-Reichs, Amphibien. 1873-1878. in H. G. Bronn, for $40.00

Essai sur la Physionomie der Serpens. 1837. by H. Schlegel, for $18.00

Poisonous Snakes of North America. 1893. by L. Stejneger for $9.00

Amphibia of Western North America. 1928. by J. R. Slevin for $13.00

Philippine Amphibia. 1920. by E. H. Taylor (original, not the reprint) for $12.00

Ca. 250 reprints and articles by over 50 authors, all dealing with herpetology, for $15.00

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ABOOD,L.G. (SEE SNISR-968INT: 81)
AGHAJANIAN,GEORGE K. (SEE BLOFE-968FSC: 361)
AL-BADRY,KAMAL S. (SEE HUSMF-967SPL: 59)
AMBROSE,M. (SEE WOLJ -968MAC:1290)
AMIN,A. (SEE LATM -967CEP: 33)
AMON,TH. (SEE HAMF -968EBD: 441)
ANDRONESCU,A. (SEE REPE -967DMC: 118)
ANDREOLETTI,GIAN EMILIO (SEE SCAF -968IFA: 382)
ANDERSON,J.W. (SEE YATMR-967COF: 535)
ANGELIER,M.-L. (SEE ANGE -968ODE: 113)
ANGELETTI,PIETRO U. (SEE LEVR -968NGF: 534)
ANTAL,A. (SEE GABM -968EDC: 125)
ANTON,A.H. (SEE GENJF-968FSP: 285)
APPLEGATE,H.G. (SEE SAXJG-967MCI: 233)
ARGIZ,C.A.GARCIA (SEE CARNJ-968PSD: 835)
ASANO,YASUSHI (SEE MARF -968IER: 569)
ASANO,Y. (SEE MARF -968RIE: 49)
ASCHENBRENNER,V. (SEE MESJ -967OCA: 564)
ASKEW,WALLACE A. (SEE CANDA-968AST: 262)
AXELROD,JULIUS (SEE WURRJ-967LEH: 493)
AYALA,STEPHEN C. (SEE ANDJR-968TTP:1023)
AYORE,M.H. (SEE MOHAH-968EEC: 51)
BABA,KEIJI (SEE KOBK -967CHH: 29)
BACHARACH,A.D.E. (SEE HALMO-968VPR: 787)
BACON,JAMES P.,JR. (SEE INGRF-968ARC: 602)
BACHMANN,KONRAD (SEE GOIOB-968DAL: 532)
BADEN,HOWARD P. (SEE ROTSI-967ASS: 345)
BADER,P. (SEE SALJ -968CET: 828)
BAGDOYAN,HELEN (SEE BRAMW-968EEO: 233)
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BARBIERI,FRANCISCO D. (SEE LEGCR-967NTB: 623)
BARSACCHI,G. (SEE MANG -967MBN: 113)
BARLOW,G.H. (SEE CHASK-967SBC: 723)
BARTELS,H. (SEE GAHH -968TSB: 232)
BARBORIAK,J.J. (SEE SMISS-967UGA: 352)
BARTH,LUCENA J. (SEE BARLG-968KSC: 387)
BARDHAN,N R. (SEE BHAS -968EEV: 46)
BARBAULT,ROBERT (SEE KNOLP-967UPE: 239)
BARWICK,RICHARD E. (SEE STERC-968RST: 541)
BARKER,S.B. (SEE TAYRE-967ANT: 659)
BARKER,S.B. (SEE KAWA -968BPN: 515)
BASKETT,THOMAS S. (SEE SCHFE-968AEG: 583)
BAUMGARDNER,F.W. (SEE HOWBJ-967BPR: 334)
BAXTER,CLAUDE F. (SEE GRALT-968EIL: 463)
BEAUMONT,ANDRE (SEE REGE -968EAD:2489)
BEAUDOIN,RICHARD L. (SEE JACT -967CPF: 70)
BECAK,WILLY (SEE BECML-967MMA: 192)
BEERBOWER,J.R. (SEE CLAJ -967GPP: 21)
BELTERMAN,TH. (SEE DAAS -968LBL: 245)
BELTERMAN,TH. (SEE DAAS -968LBL: 259)
BENSON,ELLIS S. (SEE STANA-968UFV: 99)
BERBERIAN,ALICE (SEE BRAMW-968EEO: 233)
BERRY,E.R. (SEE WATCO-968SRF: 233)
BERMAN,HERBERT J. (SEE SIGGR-968SMU: 236)
BERGMANS,W. (SEE ZWAP -967M : 76)
BERKELEY,W.H. (SEE COHP -967CSV: 820)
BERNDT,W.O. (SEE GATJT-967OCE: 659)
BHADURI,S. (SEE CHAA -968SNG: 106)
BIANCHI,C.PAUL (SEE JOHP -968EVS: 305)
BICHER,H.I. (SEE KRUJ -968CNE: 11)
BIESELE,JOHN J. (SEE BARKR-967SSA: 91)
BIRMINGHAM,M.K. (SEE NICAF-968MEF: 165)
BIRNSTIEL,M.L. (SEE EVAC -968LAR: 274)
BIROWELL,T.L. (SEE VANPF-968CPC: 349)
BLANC,CHARLES P. (SEE PASG -967LSM: 583)
BLANC,FRANCOISE (SEE BLACP-967OBA: 67)
BLANC,FRANCOISE (SEE BLACP-967UES: 57)
BLANEY,RICHARD M. (SEE ROSDA-968NNS: 1)
BLATT,WILLIAM F. (SEE ROBSM-967NRT: 355)
BLOEDEL,J.R. (SEE LLIR -967FCA: 601)
BOGDANOVA,E.V. (SEE MEDAN-967SCE: 822)
BOK,DEAN (SEE HALMO-968VPR: 787)
BOLOGNANI,L. (SEE VIAM -967DPS: 293)
BONDI,K. (SEE HOWBJ-967BPR: 334)
BORNSCHEIN,H. (SEE WUEL -968EIN: 731)
BOTBOL,V. (SEE CARNJ-968RHU: 573)
BOTBOL,VICLETA (SEE CARNJ-968PSD: 835)
BOUNHIOL,J. (SEE REMC -967ATC: 519)
BOURGUET,J. (SEE RIPP -967LTK: 482)
BOULOS,RASMY (SEE HUSMF-967SPL: 59)
BOWMAN,WALTER M. (SEE STEOO-968CVC: 219)
BRAGG,ARTHUR N. (SEE BLAJH-968NAH: 247)
BRENNAN,JAMES C. (SEE CLAHF-968ICV: 629)
BRIGGS,NORMAN (SEE HOME -968EHC: 375)
BROOKS,CHANDLER MCC. (SEE GOTM -968EPE: 303)
BROOKS,GARNETT R. (SEE MEYJ -968EBP: 122)
BROBERG,SAARA (SEE KRIR -968FAA: 1)
BRODSKY,WILLIAM A. (SEE GONCF-967SAR: 659)
BRODSKY,W.A. (SEE GONCF-968EOI: 515)
BROWN,WALTER C. (SEE ALCAC-967PET: 596)
BURCHFIELD,DONALD F. (SEE SNYDH-967FRP: 240)
BURGOS,M.H. (SEE PIERS-968CCS: 344)
BURKE,PATRICK K. (SEE WATCO-968CFI: 853)
BUROVA,V.I. (SEE AGAGB-967CPR: 151)
BUSACK,LAWRENCE D. (SEE BUSSD-967NGR: 231)
CAMPBELL,HOWARD W. (SEE SUGN -967FSS: 88)
CAPUTO,C. (SEE HORP -968EAE: 702)
CARPENEDO,F. (SEE FASG -968ECB: 240)
CARTER,LUCY (SEE COBBF-968DSP: 519)
CASKEY,C.THOMAS (SEE MARRE-967FSR: 820)
CASTRO,M.P. (SEE COHR -967RSL: 241)
CASTRO,M.P. (SEE CEIJM-967EIS: 395)
CEI,J.M. (SEE COHR -967RSL: 241)
CHATTERJEE,A. (SEE BHAS -968EEV: 46)
CHATTERJEE,A. (SEE BHAS -968IWU: 43)
CHATTERJEE,A. (SEE BHAS -968IGM: 33)
CHANG,C.C. (SEE LEECY-968PPC: 360)
CHANG,C.S. (SEE FRESE-968EHK: 31)
CHAKRABORTY,D.P. (SEE BISNM-967EPP: 271)
CHAKRABARTI,K.K. (SEE PANKC-968NTF: 218)
CHAKKO,T.V. (SEE SHARV-967HDA: 69)
CHIEFFI,G. (SEE LUPC -968SHO: 292)
CHIESA,L. (SEE PERV -967ITC:1466)
CHIU,P.J.S. (SEE LEECY-968PPC: 360)
CHIU,T.H. (SEE LEECY-968PPC: 360)
CHRISTINZIO,MARIE (SEE PAIWK-968LTP: 209)
CHUNG,S.H. (SEE ALBEX-968TIM: 407)
CIMPEANU,LUCIA (SEE DANM -968UHE: 125)
CLARK,H FRED (SEE LEHDE-967PMT: 50)
CLARK,H F. (SEE GANC -967DAR: 485)
CLERICI,PIERA (SEE GUAA -968BCN: 373)
CLERICI,PIERA (SEE GUAA -968LTN: 262)
COCITO,ANNA MARIA (SEE GUAA -968LTN: 262)
COHEN,M.W. (SEE BIRRI-968ASP: 381)
COHEN,M.W. (SEE BIRRI-968IIS: 401)
COHEN,PHILIP P. (SEE UNSBR-967ETT: 348)
COHEN,R. (SEE CEIJM-967EIS: 395)
CONDE DEL PINO,ENCARNITA (SEE MCLET-968EPT: 251)
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CORY,J.G. (SEE EATJE-967EET: 392)
CORTELYOU,J.R. (SEE MCWDJ-968IPE: 78)
COSENZA,L. (SEE DELF -967EPS: 1)
COULSON,ROLAND A. (SEE HERT -968EIF: 991)
COX,PRENTISS G. (SEE SIMSB-967VRS:1330)
CRAWLEY,M.C. (SEE ASHKR-967SVC: 148)
CRENSHAW,JOHN W. (SEE NEWRJ-967ECB: 481)
CSERNYANSZKY,HEDVIG (SEE SZIT -967IAP: 107)
CUBILLOS,M. (SEE BUSE -967CCE: 62)
CURTIS,SHERILL (SEE VOLEP-968FGC: 396)
DAIN,J.A. (SEE YIAJA-968AGD: 673)
DAMMANN,HELGA (SEE THOLJ-967ION: 271)
DASS,BANARSI (SEE CHASC-968CSD: 678)
DASKAM,JENEAN M. (SEE MEYDE-967RSL: 1)
DAVIES,R.E. (SEE KUSMJ-967EEM: 727)
DAVIES,R.E. (SEE KUSMJ-968EDA: 443)
DEB,C. (SEE BISNM-967EPP: 271)
DEDOV,I.I. (SEE VOIAA-968WSL: 765)
DEHNER,E.W. (SEE MACJM-968CSO: 858)
DELLUVA,A.M. (SEE KUSMJ-968EDA: 443)
DELRIO,G. (SEE LUPC -968SHO: 292)
DELANNEY,L.E. (SEE PRAKV-967ADE: 425)
DELY,O.G. (SEE BORI -967EVU: 65)
DEMPSTER,ROBERT P. (SEE HERES-967IHS: 30)
DESSAUER,HERBERT C. (SEE MASRJ-968PAR: 119)
DETTLAFF,T.A. (SEE AISTB-968FSF: 789)
DETTBARN,W.-D. (SEE CONE -967CBP: 403)
DEVI,P. (SEE CHASC-968CSD: 678)
DI VITA,G. (SEE BARWA-967MEN: 827)
DICK,D.A.T. (SEE BITEE-968AEA: 693)
DIDENKO,A.V. (SEE DARIA-967VTP: 971)
DIDENKO,A.V. (SEE DARYA-967CSC: 733)
DIMMICK,RALPH W. (SEE BRIWU-967RMS: 28)
DINGLE,HUGH (SEE LUNGF-968STI: 265)
DIRNER,Z. (SEE GABM -968EDC: 125)
DODD,J.M. (SEE COLR -968UOT: 34)
DOMERGUE,CHARLES A. (SEE BRYER-968CRI: 71)
DONGEN,W.J.VAN (SEE OORPG-968PDA: 549)
DORE,BRUNO (SEE GUAA -968BCN: 373)
DORNFELD,E.J. (SEE JOHTS-968CRI: 63)
DOUGLAS,NEIL H. (SEE MORDC-967NRR: 132)
DROOK,KARNINA (SEE WERYL-967MTS: 159)
DROZDOV,N.N. (SEE VANAG-967VSD: 81)
DRUKKER,J. (SEE BECAE-967HCC: 195)
DUDA,P.L. (SEE RAIMK-967PVA: 64)

DZHIBLADZE,S.V. (SEE ONITN-967ICC: 557)
EBIHARA,I. (SEE SAWY -967HAR: 51)
EDWARDS,ELEANOR (SEE MIDSA-968IHC: 335)
EDWARDS,ELEANOR (SEE MIDSA-968RUB: 57)
EISELT,JOSEF (SEE DARIS-967NNL: 107)
EL-SHERSHABY,A.M. (SEE BANMA-967HHS: 133)
EL-GOHARY,MOHAMED (SEE BANMA-967HHS: 133)
ELSAYED,E.MAHMOUD (SEE SALSA-967MPS: 109)
ELSBACH,PETER (SEE ROSA -967LCT: 768)
ELSBACH,P. (SEE ROSAA-968LLM: 72)
ENDOU,H. (SEE MARF -968RIE: 49)
ENDOU,HITOSHI (SEE MARF -9681EB: 569)
ENDEAN,R. (SEE DE G -968DCE: 48)
ENSRUD,PHYLLIS J. (SEE HERES-967IHS: 30)
ENTINE,G. (SEE LIEPA-968VPF: 761)
ERDEI,I. (SEE CSAA -967DPS: 74)
ERSPAMER,V. (SEE CEIJM-968TGB: 232)
ERSPAMER,V. (SEE DE G -968DCE: 48)
ESTEP,HERSCHEL L. (SEE WATCO-968CFI: 853)
EVANS,WILLIAM E. (SEE CAMHW-967SPT: 204)
EVENNETT,P.J. (SEE NICTJ-968EOS: 19)
EVENNETT,P.J. (SEE COLR -968UOT: 34)
FAWCETT,DON W. (SEE HAMDW-968UFN: 81)
FELDMAN,P.G. (SEE SIMR -967RRC: 429)
FERGUSON,DENZEL E. (SEE LANHF-967MOT: 81)
FERGUSON,DENZEL E. (SEE ROSP -968TEM: 783)
FERGUSON,DENZEL E. (SEE LANHF-968SCF: 27)
FIANDINI,G. (SEE FASG -968ECB: 240)
FIDLER,J.HAVELOCK (SEE WAGR -968R : 25)
FIDLER,J.HAVELOCK (SEE WAGR -968A : 20)
FIDLER,J.HAVELOCK (SEE WAGR -968ZVB: 1)
FILIPY,RONALD (SEE BLIH -968FOM: 222)
FISCH,F.W.DE (SEE FISJ -967DSC: 963)
FISHELSON,L. (SEE LEWC -967GR : 59)
FLATIN,J. (SEE DELM -967PGO: 398)
FLOCK,AKE (SEE HARGG-967SEA: 135)
FOLLETT,B.K. (SEE NICTJ-968EOS: 19)
FOLKERTS,GEORGE W. (SEE FUGCM-967SRH: 60)
FOLKERTS,GEORGE W. (SEE MOURH-968DSA: 259)
FORTE,G.M. (SEE FORJG-967ITS: 274)
FOWLER,JAMES A. (SEE STICJ-968NRE: 70)
FOX,H. (SEE MOUJM-968CSM: 415)
FRIEDEN,E. (SEE EATJE-967EET: 392)
FRIEDEN,E. (SEE FLOG -968ISH: 831)
FRISHKOPF,LAWRENCE S. (SEE LIFH -968BIF: 635)
FRIEDMAN,MARVIN (SEE VINA -967NRI: 51)
FRIEDMANN,T. (SEE KELK -968AIF: 269)
FRY,D.J. (SEE DICDA-968ADS: 2P)
FRY,D.J. (SEE BITEE-968AEA: 693)
GANTHAVORN,SOMSRI (SEE TU AT-967HPA:2125)
GARCIA ROMEU,FEDERICO (SEE SALA -968IVI: 311)
GARRIDO,ORLANDO H. (SEE SCHA -967RCI: 3)
GARRIDO,ORLANDO H. (SEE SCHA -968USL: 23)
GASDORF,E. (SEE HEAJE-968ETS: 509)
GAY,W.S. (SEE FRESE-968EHK: 31)
GEBHARDT,BRYAN M. (SEE VOLEP-968SCM: 570)
GEH,S.L. (SEE CHAKE-967AIA:1147)
GEISLER,C.DANIEL (SEE LIFH -968BIF: 635)
GERSCHENFELD,H.M. (SEE COHMW-968IEN: 363)
GHILKA,ARNOLD (SEE BRIWU-967RMS: 28)
GIACOSIE,ROBERT V. (SEE ANDJD-967ALN: 108)
GIBBONS,J.WHITFIELD (SEE ESCGW-967SIP: 818)
GILBERTI,G. (SEE PIEP -968MIB: 735)
GILBOA,ITZCHAK (SEE DOWHG-967ATC:)
GILBOA,ITZCHAK (SEE DOWHG-967PAT:)
GILBOA,ITZCHAK (SEE DOWHG-968CHT: 7)
GILBOA,ITZCHAK (SEE DOWHG-968ZRS: 405)
GILLO,L. (SEE DELP -967SVA: 29)
GILLO,L. (SEE BRIL -968ICV: 673)
GOIN,COLEMAN J. (SEE GOIOB-968DAL: 532)
GOIN,COLEMAN J. (SEE HOBJA-968SBF: 184)
GOIN,OLIVE B. (SEE HOBJA-968SBF: 184)
GOIN,OLIVE B. (SEE GOICJ-968NGT: 581)
GOLDOBIN,A.S. (SEE ARTVV-967ROR:1111)
GOIN,COLEMAN J. (SEE GOIOB-967NDC: 233)
GOLDSTEIN,MOISE H.,JR. (SEE LIFH -968BIF: 635)
GOLICHENKOV,V.A. (SEE SEDIF-968BMT:1235)
GOLITCHENKOV,V.A. (SEE SAKNY-968SCR: 896)
GONA,A.G. (SEE ETKW -967AAP: 703)
GOORIS,RAYMOND J. (SEE SKIMF-968CRF: 379)
GORBMAN,AUBREY (SEE JASA -967HNS: 271)
GOSSELIN,R.E. (SEE GATJT-967OCE: 659)
GRANOFF,ALLAN (SEE MAER -967RBI: 137)
GRANOFF,ALLAN (SEE TWEK -968EFV: 407)
GIORDANA,B. (SEE LIPC -967EAB: 966)
GIRGIS,ADIB H. (SEE SALSA-967MPS: 109)
GITTER,S. (SEE KRUJ -968CNE: 11)
GLASSER,ROBERT B. (SEE SCHFC-968LIH: 23)
GRANDA,A.M. (SEE ZWIH -968BDD: 239)
GRAHAM,RICHARD E. (SEE ANDJD-967VMS: 371)
GREGORY,HARRY (SEE EASDA-967FRM: 239)
GRIM,J.NORMAN (SEE WOLSL-967RIC: 382)
GROSCHOFF,VERA I. (SEE ROEFA-967WSS: 1)
GURDON,J.B. (SEE WOOHR-968RRS: 363)
GUS'KOV,L.N. (SEE ARTVV-967ROR:1111)
HADLEY,MAC E. (SEE BENBJ-968CAR: 18)
HADLEY,MAC E. (SEE BAGJT-968DCU: 67)
HADLEY,MAC E. (SEE GOLIP-968AAM: 59)
HAMILTON,J.T. (SEE GINBL-968ECI: 162)
HAMA,K. (SEE UGAS -967EMS: 45)
HANDLER,J.S. (SEE ARGWP-967CME: 803)
HANDLER,J.S. (SEE ARGWP-967ECM: 711)
HANDLER,J.S. (SEE FERDR-968EST: 150)
HANKE,W. (SEE PEPFW-968FIR: 281)
HAQUE,M. (SEE BISNM-967EPP: 271)
HARDMAN,H.F. (SEE SMISS-967UGA: 352)
HARBOTTLE,JUDITH A. (SEE BENMF-968EHB: 92)
HAYES,WILLIAM N. (SEE HERDR-967EMT: 25)
HECHT,MAX K. (SEE WASRJ-967SCG: 30)
HECHT,MAX K. (ED) (SEE DOBT -968EB : 1)
HEIFFER,M.H. (SEE VICJA-968PEL: 707)
HEMMER,HELMUT (SEE FLIR -968UBV: 99)
HEPP-REYMOND,MARIE-CLAUDE (SEE WEVEG-967ASF: 681)
HERTZLER,DAVID R. (SEE HAYWN-968VRH: 331)
HERNANDEZ D.,EDUARDO (SEE CHAH -967ABP: 3)
HERNANDEZ,THOMAS (SEE COURA-968AAM: 861)
HIBBARD,EMERSON (SEE SWIJE-967CMA: 433)
HIMSTEDT,W. (SEE WUEL -968EIN: 731)
HIRSCHOWITZ,B.I. (SEE SHORL-967EMA: 273)
HOBSON,B.M. (SEE BARWA-967MEN: 827)
HOGBEN,C.ADRIAN M. (SEE FOXKR-967ATN: 502)
HOGBERG,DAVID K. (SEE HAYWN-968VRH: 331)
HOH,J.F.Y. (SEE CLOR -968ENC: 103)
HOKAMA,Z. (SEE SAWY -967HAR: 51)
HOLOWACH,J. (SEE MCODB-968EAE: 577)
HOLEMANS,K.C. (SEE MEIHS-968FMR: 465)
HORN,ROBERT C.,JR. (SEE FING -9681FP: 171)
HOWE,M.C. (SEE MCODB-968EAE: 577)
HUANG,C.C. (SEE GANC -967DAR: 485)
HUEBENER,E. (SEE HORV -967RVS: 73)
HUE,ERNST G. (SEE CAMJP-967EFS: 213)
HUF,E.G. (SEE FRIRT-967ATI: 592)
HUF,E.G. (SEE WATCO-968SRF: 233)
HUMPHREY,STEPHEN S. (SEE RANAS-968ICT: 1)
HUNSAKER,DON,II (SEE JACL -968SLD: 243)
HUTCHISON,VICTOR H. (SEE ROBSM-967NRT: 355)
IAZIGIAN,ANA (SEE ARSG -967CRP: 28)
IMRE,S. (SEE SZIT -9671AP: 107)
INDIRA,K. (SEE SWAKS-967SEC: 259)
INGLIS,J.M. (SEE SAXJG-967MCT: 233)
ISHCHENKO,V.G. (SEE SCHSS-968DGS: 127)
ISOYA,TETSUO (SEE NAKO -968NMB: 522)
IVANOVA,G.I. (SEE PISLN-967RBE: 666)
JACKSON,J.W. (SEE SANSS-967EAI: 712)
JAMNBACK,HUGO (SEE WHIE -968ARS: 645)
JARED,D.W. (SEE WALRA-968SPS: 953)
JONES,E.M. (SEE MCODB-968EAE: 577)
JONGKIND,J.F. (SEE QUAWB-967LEC: 305)
JUHASZ,P. (SEE TOMT -967RMF: 49)
JURAND,A. (SEE MOUJM-968CSM: 415)
KAMEL,A. (SEE MOHAH-968EEC: 51)
KANE,J.F. (SEE ROTAJ-968ATH: 579)
KAPLAN,HAROLD M. (SEE PAYJE-968BPG: 203)
KAPPERS,J.ARIENS (SEE QUAWB-967LEC: 305)
KARZON,D.T. (SEE CLAHF-967ATE: 269)
KARZON,DAVID T. (SEE LEHDE-967PMT: 50)
KARZON,DAVID T. (SEE CLAHF-968ICV: 629)
KARTEN,HARVEY J. (SEE POHLA-968PTA: 239)
KASCHEF,AHMED H. (SEE SALSA-967MPS: 109)
KAWADA,JUN (SEE TAYRE-967ANT: 659)
KAWAMURA,Y. (SEE SAWY -967HAR: 51)
KECSKEMETI,VALERIA (SEE KELK -968AIF: 269)
KELLY,S.J. (SEE DAVTL-968PFC: 233)
KERECSEN,L. (SEE SZAB -967SES: 61)
KHIM,JIN KYUNG (SEE HONSK-968SCA: 439)
KHODOROV,B.I. (SEE VOREG-967IHM: 3)
KILALIC,T. (SEE SVOT -967ELD: 125)
KILALIC,T. (SEE SVOT -967VEU: 3)
KIM,SANGDUK (SEE PAIWK-968LTP: 209)
KING,ROBERT B. (SEE JOSBS-968CDT: 719)
KIRSCHSTEIN,H. (SEE OKSA -968UEF: 159)
KIRSCHNER,LEONARD B. (SEE DIETH-967RST: 85)
KIRSTEN,R. (SEE KIRE -9681AE: 213)
KIRSCHE,WALTER (SEE HENE -967HIL: 233)
KITAI,S.T. (SEE LLIR -967CPC:1328)
KLEEMAN,C.R. (SEE BRAMW-968EEO: 233)
KLEEMAN,CHARLES R. (SEE MIDSA-968IHC: 335)
KLEEMAN,CHARLES R. (SEE MIDSA-968RUB: 57)
KNIGHT,JULIE (ED) (SEE DE AV-967CD : 1)
KNOEPFFLER,L.PH. (SEE COMC -967ORO: 85)
KOCHIYAMA,YOSHIO (SEE HANS -968SFA: 44)
KOCHIYAMA,YOSHIO (SEE HANS -968SFA: 44)
KOEVER,A. (SEE CSAA -967DPS: 74)
KOENIG,VIRGIL L. (SEE COBBF-967ESS: 820)
KOENIG,VIRGIL L. (SEE COBBF-968DSP: 519)
KOH,K.H. (SEE LEVH -968TWS:XXII)
KOKETSU,K. (SEE KARAG-968PRS: 241)
KOSORIC,DJ. (SEE POCZ -967NFP: 183)
KOSHARSKAYA,I.L. (SEE BABEB-967CCC: 7)
KOVARIKOVA,A. (SEE CHEKK-967PTT:1535)
KOVACS,T. (SEE SZAB -967SES: 61)
KRAULIS,I. (SEE NICAF-968MEF: 165)
KRAL,V. (SEE MESJ -967OCA: 564)
KRUGER,L. (SEE SIMR -967RRC: 429)
KUBICZ,ALEKSANDRA (SEE CHUS -968SHM: 233)
KUFFLER,S.W. (SEE COHMW-968IEN: 363)
KUSAKINA,A.A. (SEE GLUMA-967TSP: 115)
LA MALFA,J.A. (SEE RODEM-967DOH: 487)
LAMB,J.F. (SEE GRAJA-968EAT: 479)
LANZA,BENEDETTO (SEE TORE -968PAR: 1)
LANDRETH,HOBART F. (SEE FERDE-967SCO: 45)
LARSEN,P.REED (SEE WOLJ -968MAC:1290)
LEAF,ALEXANDER (SEE KIRMA-968EAG: 22)
LEAF,A. (SEE KIRE -9681AE: 213)
LEATHEM,JAMES H. (SEE GAUR -967CEH:1192)
LEATHEM,JAMES H. (SEE CALIP-967SAD: 59)
LEE,DAVID S. (SEE FUNJB-967DLS: 65)
LEE,S.Y. (SEE LEECY-968PPC: 360)
LEE,WILLIAM H. (SEE REGJD-968PAC: 173)
LEONG,L.T. (SEE LEVH -968TWS:XXII)
LEWIS,HAROLD L. (SEE ROSFL-968CWF: 149)
LEW,V.L. (SEE CARNJ-968PSD: 835)
LICHT,P. (SEE SHOVH-967TDW: 255)
LIM,GAIK S. (SEE BERPY-967BPP: 307)

LIMLOMWONGSE,L. (SEE FORJG-967ITS: 274)
LISSAK,K. (SEE KOML -967SAE: 30)
LISSAK,K. (SEE PUPA -968FFP: 285)
LOFTS,B. (SEE OORPG-968PDA: 549)
LOLLEY,RICHARD N. (SEE GRALT-968EIL: 463)
LOOP,MICHAEL S. (SEE CRAFT-967CRS: 36)
LOW,BOBBI (SEE LICLE-968CRS: 547)
LURIE,D. (SEE ARMWM-967RIF: 382)
LYNCH,JOHN D. (SEE SMIHM-967NCL: 18)
MACDONALD,J.R. (SEE HARJC-967MBF: 1)
MADERSON,P.F.A. (SEE CHIKW-967RTC: 463)
MAIN,A.R. (SEE STRIR-967SPG: 11)
MAIN,A.R. (SEE BRASD-968BAR: 193)
MAIER,CHARLES S. (SEE SINM -967RBC: 89)
MANSUETO-BONACCORSO,CATERINA (SEE JACG -967AAA: 724)
MARTIN,A.A. (SEE LITMJ-967RHA: 31)
MARTIN,A.A. (SEE LITMJ-968AIT: 7)
MARTIN,A.R. (SEE MALA -968RBQ: 593)
MARTIN,DENIS G. (SEE KIRMA-968EAG: 22)
MARGOLIASH,E. (SEE CHASK-967SBC: 723)
MARTIN,ELIEZER (SEE ALVT -967DUN: 1)
MARTIN,ELIEZER (SEE ALVT -967ZMU: 1)
MARUT,FRED,JR. (SEE NAGR -968LBP: 9)
MARRIOTT,JANE C. (SEE EDMCJ-967EAA: 517)
MARTIN,MICHAEL (SEE BURRB-967FSR: 487)
MARTINO,PASCHAL J. (SEE ANDJD-967FHE: 105)
MATZ,GILBERT (SEE STEO -967TT : 21)
MATTEI,XAVIER (SEE BOIC -967VGS: 9)
MAYS,CHARLES E. (SEE NICMA-968MAC: 125)
MAZEIKAITE,L. (SEE OSTM -967SNR: 91)
MAZZI,VALDO (SEE VELC -967EPP: 207)
MCDANIELS,A.E. (SEE NICMA-967ABN: 60)
MCINTYRE,THOMAS J. (SEE CAMS -967SV : 42)
MCKINNEY,CHARLES O. (SEE BALRE-968DPM: 264)
MCKINNON,ELIZABETH L. (SEE SIGGR-968SML: 236)
MEANS,ROBERT G. (SEE WHIE -968ARS: 645)
MEIJER,A.E.F.H. (SEE BECAE-967HCC: 195)
MERCER,E.H. (SEE LEEAK-967CSD: 87)
MESZAROS,J. (SEE KOSW -967ESC: 783)
MICHALJANIC,A. (SEE MESJ -967OCA: 564)
MILLINGTON,P.F. (SEE BROAC-968EMS: 83)
MITCHEN,JACQUE (SEE OGRH -967TOU: 130)
MITCHELL,J.L. (SEE STEW -967TNG: 9)
MOLINA,J.C. (SEE BIANO-968ACC: 183)
MONTSKO,T. (SEE KOML -967SAE: 30)
MORALES,AZORIDES R. (SEE FING -968IFP: 171)
MORPURGO,GIORGIO (SEE LEGT -968CCT: 493)
MORISAWA,SEIJI (SEE SETY -968AAP: 53)
MUELLER,W. (SEE ALTH -968EEU: 151)
MULHERKAR,LEELA (SEE ATHMV-967SNE: 89)
MURDOCK,D.S. (SEE TU AT-967PNG:)
MURRAY,KEITH F. (SEE BRAAH-968TNS: 1)
NAKAMOTO,EIICHI (SEE KOBK -967OHH: 29)
NAKA,K.-I. (SEE KISK -968IED: 833)
NAKAMURA,TOSHIO (SEE HONR -967RVL: 400)
NALL,RAYMOND W. (SEE SNYDH-967FRP: 240)
NARA,A. (SEE PRID -968EGD: 261)
NASTUK,WILLIAM L. (SEE MARLA-968SOF:1357)
NEMOTO,TAKUMITSU (SEE NOMH -967TRG: 175)
NIAUSSAT,P. (SEE GREC -967AER: 2)
NICKERSON,MAX A. (SEE MAYCE-968NBI: 258)
NICKERSON,MAX A. (SEE MAYCE-968NSS: 619)
NIEMIERKO,STELLA (SEE KLOI -968ITA: 31)
NIKOLSKY,N.N. (SEE VINNA-967DSF: 658)
NIKOLSKY,N.N. (SEE VINNA-968ESF: 822)
NIRENBERG,MARSHALL (SEE MARRE-967FSR: 820)
NORTHMORE,D.P.M. (SEE MUNWR-968BLT: 787)
NORTHCUTT,R.G. (SEE HEAJE-968ETS: 505)
NORLANDER,SUSAN (SEE SODP -967PEA: 22)
NOWAKOWSKI,ANDRZEJ (SEE GRZS -967HOM: 611)
NUNEZ,J. (SEE MAUJ -968SIT: 47)
OBANDO,C.PENA (SEE REYGR-967EDS: 125)
OBO,FUJIO (SEE SETY -968AAP: 53)
OKA,TOSHIKI (SEE FUJM -968MVA: 42)
OKADA,YAICHIRO (SEE MATT -968NSG: 1)
OKONOGI,T. (SEE SAWY -967HAR: 51)
OKTEM,NIRMET (SEE PUYP -967OCN: 223)
ONO,TSUGIO (SEE KOBK -967OHH: 29)
ONOUE,YOSHIYUKI (SEE NOMH -967TRG: 175)
OOMURA,YUTAKA (SEE TAKK -968CIC: 285)
OORDT,P.G.W.J.VAN (SEE GOOHJ-967PMP: 453)
ORESHUK,F.A. (SEE SOKEI-967ICG: 684)
ORLOV,D.S. (SEE CHUYO-968AFR:1198)
ORLOFF,J. (SEE ARGWP-967CME: 803)
ORLOFF,JACK (SEE FERDR-968EST: 150)
ORSKA,Z. (SEE MESJ -967OCA: 564)
ORTIZ-PINEDA,JUANA (SEE SOBG -967CUA: 283)
OTTOSON,D. (SEE ALBEX-968TIM: 407)
PAGANELLI,C.V. (SEE COMRW-967EEA: 712)
PALOMBI,FIORETTA (SEE ROSA -968ACD: 115)
PALSER,IRENE (SEE DOWHG-968CHT: 7)
PALACIOS,R. (SEE SOBG -968RLA: 335)
PARK,CHUN SIK (SEE HONSK-968SCA: 439)
PARTISS,J. (SEE AKCA -967EMD: 403)
PARSONS,L.C. (SEE HUGSE-966FSS: 371)
PARKER,MARTIN I. (SEE ORTR -968TAS: 139)
PARMALEE,PAUL W. (SEE MUNEA-967AHR: 200)
PARK,YANG SAENG (SEE HONSK-968SCA: 439)
PATON,W.D.M. (SEE MILKW-967AVH: 97)
PEETERS,J. (SEE DELP -967SVA: 29)
PENA OBANDO,CARLOS (SEE RUIG -967EDS: 125)
PENEA,C. (SEE DANM -968UHE: 125)
PENA,R.V. (SEE HUGSE-966FSS: 371)
PEREZ,R.TAMAYO (SEE REYGR-967EDS: 125)
PETROVICI,AL. (SEE DANM -968UHE: 125)
PEYROT,ALBERTO (SEE VELC -967EPP: 207)
PEZZANI-HERNANDEZ,SILVIA (SEE SALA -968IVI: 311)
PHILLIPS,J.G. (SEE CHIKW-967RTC: 463)
PHILLIS,J.W. (SEE TEBAK-968RRC:1035)
PIEAU,CLAUDE (SEE RAYA -968PCE: 197)
PIEZZI,RAMON S. (SEE RODEM-967VHR: 207)
PINTO,R.MAGALHAES (SEE RODHO-967ODF: 123)
PODOLSKY,RICHARD J. (SEE FORLE-968FDC: 375)
POPOV,V.V. (SEE SEDIF-968BMT:1235)
POPOV,V.V. (SEE BORRA-968RPL:1500)
PORTO,ANA M. (SEE GROEG-967BBT: 177)
PORTER,DAVID (SEE DIETH-967RST: 85)
POSTLES,DAVID H. (SEE HALBP-967FGR: 544)
POUGH,MARGARET B. (SEE POUFH-968SSP: 612)
PRESTON,AGNES S. (SEE HANJS-968CGT:1376)
PREMACHANDRA,B.N. (SEE MEDAK-967TIM: 588)
PRESCOTT,J.M. (SEE SPIAM-968SEP: 841)
PRESCOTT,J.M. (SEE WAGFW-968LPA:4486)
PRECHT,W. (SEE LLIR -967CPC:1328)
PRIVITERA,C.A. (SEE ROTAJ-968ATH: 579)
PRIBOR,D. (SEE NOVR -968IDS: 251)
PRIEST,W.CURTIS (SEE SABHC-968TED: 235)
RABINOWITZ,JOSEPH L. (SEE SHAPP-968TAC: 427)
RABELLO,MARIA NAZARETH (SEE BECML-967MMA: 192)
RABINOVITCH-MAHLER,N. (SEE BRIL -968ICV: 673)
RAHN,H. (SEE HOWBJ-967BPR: 334)
RANGNEKAR,P.V. (SEE SABPB-968MIS: 125)
RAO,M.A. (SEE CHAV -967ESH: 508)
RAPUZZI,G. (SEE PERV -967ITC:1466)
RAPUZZI,G. (SEE PERV -967ITC:1470)
RAPUZZI,G. (SEE PERV -967ITC:1472)
RAVIOLA,ELIO (SEE GERG -967AUE: 139)
RAVIOLA,GIUSEPPINA (SEE RAVE -967OSS: 134)
RAVKINA,L.I. (SEE SVEGJ-967PCS: 300)
RAWLEY,ALAN A.(SEE RAWEV-967IMI: 71)
RAY,A.K. (SEE GANDN-967CNA: 143)
REHMER,HELMUT (SEE SCHB -967RDR: 453)
REHM,W.S. (SEE SANSS-967EAI: 712)
REHM,W.S. (SEE DAVTL-968PFC: 233)
RELYEA,KENNETH (SEE BLARM-967ZSP: 246)
RENGEL,D. (SEE PISA -967CNB: 59)
RENO,HARLEY W. (SEE GEHFR-968BSD: 784)
ROBERTS,C.R. (SEE VICJA-968PEL: 707)
ROBERTSON,J.S. (SEE WEAWG-967RFT: 53)
ROGERS,A.W. (SEE DICDA-968ADS: 2P)
ROGULSKI,JERZY (SEE HANJS-968CGT:1376)
ROGALLO,VERNON L. (SEE TREJW-968PAM: 114)
ROSS,GRIFF (SEE WURRJ-967LEH: 493)
ROSEGHINI,M. (SEE CEIJM-968TGB: 232)
ROSEGHINI,M. (SEE DE G -968OCE: 48)
ROSENBERG,P. (SEE CONE -967CBP: 403)
ROSE,S.M. (SEE ROSFC-967NPR: 375)
RUBEN,L.N. (SEE BALM -967TLX: 654)
RUBEN,L.N. (SEE BALM -968LTA: 238)
RUTHERFORD,JOHN M. (SEE BRARA-967ACP: 537)
RUTLEDGE,L.T. (SEE WILWJ-967PCS: 714)
RUTTER,W.J. (SEE LEBHG-967GDV:1198)
RZEHAK,KAROL (SEE SINM -967RBC: 89)
SABAU,M. (SEE ARSG -967CRP: 28)
SACHS,G. (SEE SHORL-967EMA: 273)
SACCHI,O. (SEE PERV -967ITC:1472)
SACCHI,O. (SEE PERV -967ITC:1470)
SADNIK,L.I. (SEE CARNJ-968RHU: 573)
SAINT GIRONS,H. (SEE GABM -967DHT: 571)
SAKAI,F. (SEE HOST -967CER: 627)
SALIBIAN,ALFREDO (SEE GARF -968SUA: 465)
SALLAM,ABDEL SATTAR M. (SEE SALSA-967MPS: 109)
SALISBURY,G.W. (SEE HARRG-967ESA: 645)
SALABE,H. (SEE WOLJ -968MAC:1290)
SAMPIETRO,PIERO (SEE SCAF -968IFA: 382)
SAMSONOVA,V.G. (SEE MKRLI-967SNF:1031)
SAMSONOVA,V.G. (SEE MKRLI-968RCP: 501)
SAMBRAY,Y.M. (SEE BRABM-967MFC:1210)
SANDOW,ALEXANDER (SEE GEFES-968CCK: 375)
SANTANA,FREDERICK J. (SEE HOOH -968TIM: 722)
SANYAL,M.K. (SEE PRAMR-967SRR:1058)
SANYAL,R.K. (SEE SINGS-968ASV: 428)
SAPP,THERESA M. (SEE COHSG-968HSF:1288)
SASAOKA,T. (SEE MARF -968RIE: 49)
SASAOKA,TAKUO (SEE MARF -968IEB: 569)
SATCHELL,D.G. (SEE FRESE-968EHK: 31)
SATO,M. (SEE YONK -967RMP: 678)
SAXEN,L. (SEE TOIS -968MIP: 539)
SAYRE,D.F. (SEE GENJF-968FSP: 285)
SCHWARTZ,ALBERT (SEE GAROH-968CLG: 197)
SCHWARTZ,ALBERT (SEE GAROH-968ARA: 1)
SCHUGURENSKY,ANA E. (SEE BARFD-967CEO: 77)
SCHLAUCH,FREDERICK C. (SEE BURJM-968LAR: 21)
SCHWARTZ,I.L. (SEE EGGP -968CRI: 444)
SCHWARTZ,IRVING L. (SEE EGGP -968ENH: 979)
SCHACHER,JOHN F. (SEE SULA -968BAG: 831)
SCHLIPPENBAKH,N.J. (SEE GULPI-968ENM:1504)
SCHEWE,T. (SEE COUC -968LRI: 153)
SCHWANER,TERRY D. (SEE FUGCM-968SDG: 253)
SCHILB,THEODORE P. (SEE BROWA-967MAT:1314)
SCOTT,NORMAN J.,JR. (SEE VILJD-967ILE: 474)
SCOTT,NORMAN J. (SEE ROSDA-968IHW: 262)
SCULTETY,L. (SEE KELK -968AIF: 269)
SELIGMANN,E.B.,JR. (SEE COHP -967CSV: 820)
SENG,R. (SEE SALJ -968CET: 828)
SERBAN,MIHAIL (SEE COTD -967FSM: 301)
SHARP,GEOFFREY W.G. (SEE KIRMA-968EAG: 22)
SHARP,G.W.G. (SEE KIRE -968IAE: 213)
SHASKAS,JOHN R. (SEE COHSG-968HSF:1288)
SHAMLOO,K.D. (SEE LATM -967CEP: 33)
SHAW,MARGERY W. (SEE PENLA-968CNL: 467)
SHAMOO,Y.E. (SEE GONCF-967SAR: 659)
SHAMOO,Y.E. (SEE GONCF-968EOI: 515)
SHCHERBAK,N.N. (SEE DARIS-968APL: 93)

SHEPHARD,DAVID C. (SEE GRAJA-968EPT:1274)
SHERMAN,ROBERT E. (SEE WHIWG-968AAR: 233)
SHIOKAWA,KOICHIRO (SEE SAMM -968ELM: 385)
SHMANTZAR,I.A. (SEE RUMPP-967UMF:1129)
SHMERLING,ZH.G. (SEE DETTA-968PPP: 501)
SHRIVER,J.E. (SEE NOBCR-967POA: 316)
SIMKISS,K. (SEE JENNK-968CPM: 865)
SIMMONS,ROBERT S. (SEE HARHS-967ADG: 234)
SIMMONS,ROBERT S. (SEE STICJ-968NRE: 70)
SINGH,HARI P. (SEE GESPK-968CBL: 572)
SINGH,S.N. (SEE RAOPN-968ANS: 111)
SKINNER,SHIRLEY M. (SEE SKIMF-968CRF: 379)
SKOREPA,A.C. (SEE FOLGW-967STC: 63)
SMITH,E.B. (SEE MILKW-967AVH: 97)
SMITH,L.DENNIS (SEE ECKRE-968PSA: 232)
SMITH,MICHAEL H. (SEE GENJB-968FHB: 562)
SMITH,MEREDITH J. (SEE SMYM -968OSS: 575)
SMITH,SAMUEL C. (SEE MCMGF-968TFA: 211)
SMITH,WILLIAM R. (SEE MAFR -967RBI: 137)
SNIDER,R.S. (SEE SNISR-968INT: 81)
SOEDA,S. (SEE KARAG-968PRS: 241)
SOH,N.M. (SEE LEVH -968TWS:XXII)
SOLINGER,R.E. (SEE GONCF-968EDI: 515)
SPATH,J.A.,JR. (SEE WATCO-968SRF: 233)
SPANGLER,S.G. (SEE SANSS-967EAI: 712)
SPIEKERMAN,A.M. (SEE WAGFW-968LPA:4486)
SPITZENBERGER,FRIEDERIKE (SEE EISJ -967T : 357)
STAGNI,ANNA (SEE VANE -968RPT: 683)
STAPLE,EZRA (SEE SHAPP-968TAC: 427)
STAUBESAND,J. (SEE EMSP -968SFS: 599)
STEINBACH,A.B. (SEE STEE -968APC: 4P)
STEPHENS,ROBERT C. (SEE LOCRB-967ANS: 1)
STEERE,WILLIAM C. (ED) (SEE DOBT -968EB : 1)
STOLKOWSKI,JOSEPH (SEE STAH -967EMI:1518)
STREJCKOVA,ALEXANDRA (SEE SERZ -968EFF: 383)
STREETT,W.B. (SEE MILKW-967AVH: 97)
SVOB,T. (SEE SELE -967VRT: 124)
SWAMI,KARUMURI S. (SEE INDP -967EFS: 121)
SWAMI,KARUMURI S. (SEE DASPM-968ECS: 19)
SWAMI,KARUMURI S. (SEE MURP -968IEE: 106)
SZABO,B. (SEE KOVT -967IVI: 60)
SZABO,D. (SEE TOMT -967RMF: 49)
SZABO,GEORGE (SEE MADPF-967EMA: 86A)
SZABOLCS,M. (SEE CSAA -967DPS: 74)
SZEKELY,G. (SEE CZEG -967RMP: 14)
SZEKELY,G. (SEE STRK -967FAT: 449)
SZOEDER,A. (SEE SZAB -967SES: 61)
TAGLIETTI,V. (SEE PIEP -968MIB: 735)
TAKAHASHI,KEIKO (SEE MATT -968SBE: 41)
TAMBURLINI,S. (SEE ARSG -967CRP: 28)
TANAKA,KEN-ICHI (SEE KOBK -967OHH: 29)
TANNER,WILMER W. (SEE JENRL-968OMP: 1)
TARRAB,REBECA (SEE SOBG -967CUA: 283)
TARRAB,R. (SEE SCBG -968RLA: 335)
TAYLOR,HARRY L. (SEE WALJM-968CS : 1)
TAYLOR,JOHN D. (SEE BAGJT-968DCU: 67)
TAYLOR,R.E.,JR. (SEE KAWA -968BPN: 515)
TCHERNOV,E. (SEE BARO -967AFF: 104)
TESSMAN,NORMAN (SEE WEBSD-967VEL: 379)
THAPLIYAL,J.P. (SEE PANSK-967ELD: 121)
THOMAS,C.A. (SEE MCDDB-968EAE: 577)
THURMAN,EUGENE (SEE MCARD-967ENI: 767)
TIEDEMANN,HEINZ (SEE KOCU -968ICN: 375)
TIGYI,A. (SEE KOML -967SAE: 30)
TIGYI,A. (SEE PUPA -968FFP: 285)
TINKLE,DONALD W. (SEE MILWW-967TWM: 180)
TINKLE,DONALD W. (SEE PENLA-968CNL: 467)
TISDALE,H. (SEE SALJ -968CET: 828)
TOERK,I. (SEE WENT -968CMC: 83)
TOMAN,J.E.P. (SEE AKCA -967EMD: 403)
TOMAN,JAMES E.P. (SEE SABHC-968TED: 235)
TOMAYO PEREZ,RUBEN (SEE RUIG -967EDS: 125)
TOMCSANYI,T. (SEE JUHP -967DAI: 30)
TOOM,P.M. (SEE TU AT-967FPE:)
TOOM,PAUL M. (SEE TU AT-967HPA:2125)
TOOM,P.M. (SEE TU AT-967PLH: 439)
TORRES,FRANK (SEE HEAH -967DGV: 63)
TREMOR,JOHN W. (SEE YOURS-968EWD: 609)
TROSHIN,A.S. (SEE VINNA-967DSF: 658)
TROSHIN,A.S. (SEE VINNA-968ESF: 822)
TROMBERT,MONIQUE (SEE STAH -967EMI:1518)
TRUBCHENINOVA,L. (SEE SVEGJ-967PCS: 300)
TRUEB,LINDA (SEE MYECW-967HAS: 235)
TRUEB,LINDA (SEE DUEWE-967TNS: 125)
TSENG,T.C. (SEE LEECY-968PPC: 360)
TUCHKOVA,S.J. (SEE POLLV-968THM: 754)
TURNER,FREDERICK B. (SEE HODGA-968CSL: 262)
TYLER,MICHAEL J. (SEE BROWC-968FGP: 69)
UDEL'NOV,M.G. (SEE ROZLV-967CAF: 800)
ULYANOVA,V.V. (SEE POPVV-967SDE: 728)
UNGIADZE,A.A. (SEE ONITN-967ICC: 557)
VAN PEENEN,P.F.DIRK (SEE HOOH -968TIM: 722)
VARGA,E. (SEE KOVT -967IVI: 60)
VEGA,J.A. (SEE RODEM-967DOH: 487)
VESELL,ELLIOT (SEE WURRJ-967LEH: 493)
VIDREQUIN-DELIEGE,M. (SEE SALML-967ASE: 501)
VOLANSCHI,DAN (SEE SERZ -968EFF: 383)
WALTON,J. (SEE KREB -967CMB:1150)
WALASEK,O.F. (SEE CHASK-967SBC: 723)
WALTER,R. (SEE EGGP -968CRI: 444)
WALTER,RODERICH (SEE EGGP -968ENH: 979)
WALKER,T.J. (SEE LLOJE-967NNE:1525)
WARE,F. (SEE GRAGD-968PEM: 225)
WATKINS,JULIAN F.,II (SEE CEHFR-968BSD: 784)
WATTHEWS,THOMAS H. (SEE WHIE -968ARS: 645)
WERMUTH,JCHANNA (SEE WERH -967AR :)
WEST,GEORGE C. (SEE HUTVH-967LMA: 1)
WESSELLS,NORMAN K. (SEE WILFH-967MDB: 1)
WHALEN,W.J. (SEE GORRW-967RBP: 500)
WHITLOCK,DAVID G. (SEE JOSBS-968CDT: 719)
WILLIAMS,J.C.P. (SEE BOYA -968SMF: 10P)
WINEGRAD,S. (SEE SOPJA-967ESC: 597)
WINCKLER,SUZANNE (SEE LONWR-968WS : 20)
WISMANN,KIM (SEE SCHFC-968LIH: 23)
WISE,R.W. (SEE STRLP-967CCD: 808)
WOLSKY,ALEXANDER (SEE WOLMI-967ITR: 747)
WOLFSON,N. (SEE FRYDA-968BOM: 543)
WOO,M.Y. (SEE SIMR -967RRC: 429)
WORTHINGTON,W.C.,JR. (SEE FOLS -967HCI: 44)
WRIGHT,PAUL A. (SEE MCMGF-968TFA: 211)
WURTMAN,RICHARD J. (SEE POHLA-968PTA: 239)
WYSSBROD,H.R. (SEE GONCF-967SAR: 659)
WYSSBROD,H.R. (SEE GONCF-968EDI: 515)
YAMANA,KIYOTAKA (SEE SAMM -968ELM: 385)
YAMANA,KIYOTAKA (SEE SHIK -968SMR: 379)
YAMAZARI,KEIKO (SEE MATT -968SBE: 41)
YAMAKAWA,M. (SEE SAWY -967HAR: 51)
YAMADA,TUNEO (SEE ZALSE-967CCD: 385)
YAMADA,T. (SEE MARF -968RIE: 49)
YARNELL,ROY M. (SEE BRABH-968ABT: 222)
YASUDA,TORU (SEE NISS -967RHT: 297)
YOSHIDA,A. (SEE MARF -968RIE: 49)
YOSHIDA,JULIA K.(SEE CARCC-967OTA: 57)
YOSHIOKA,S. (SEE YAME -967CFA: 79)
YUR'EV,S.A. (SEE ROZLV-967OAF: 800)
YUSHMANOVA-RAKOVA,A.V. (SEE ROZLV-967OAF: 800)
ZABOTIN,V.I. (SEE GULPI-968ENM:1504)
ZADUNAISKY,J.A. (SEE FISJ -967DSC: 963)
ZAIN,BARBARA K. (SEE LATSA-967ITS: 121)
ZAIN-UL-ABEDIN,M. (SEE ZAIBK-967CAF: 173)
ZAIN-UL-ABEDIN,M. (SEE LATSA-967ITS: 121)
ZAKI,OMAR AHMED (SEE LONC -967EWV: 763)
ZEIGEL,ROBERT F. (SEE CLAHF-968ICV: 629)
ZIEGLER,DANIEL M. (SEE MACJM-968CSO: 858)
ZIEGLER,IRMGARD (SEE KOKN -968WTR: 860)
ZIGMOND,MICHAEL J. (SEE POHLA-968PTA: 239)
ZIMKA,J. (SEE STAA -968FPF: 101)
ZWART,P. (SEE ELKE -967ODY: 201)

*** THERE IS SOME QUESTION IN OUR MINDS AS TO WHETHER THIS LIST OF JUNIOR AUTHORS IS WORTH-WHILE AND WE INVITE YOUR COMMENTS ON IT. UNLESS THERE IS SOME STRONG OPINION EXPRESSED IN FAVOR OF A LIST OF JUNIOR AUTHORS, IT WILL BE OMITTED FROM FUTURE LISTS OF CURRENT TITLES.



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(ITAL, ENG ABSTR)

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Current Herpetological Titles, IV 1968

By H. G. Dowling, Itzchak Gilboa, and Irene Palser

GENERA OF REPTILES, American Museum of Natural History, New York, New York 10024.

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THIS FOURTH LIST OF CURRENT HERPETOLOGICAL TITLES (SEE HERPETOLOGICAL REVIEW NUMBERS 2, 3, & 4 FOR PREVIOUS LISTS) INCLUDES ADDITIONAL TITLES FROM 1967 THAT HAVE COME TO OUR ATTENTION AND 1968 TITLES THAT HAVE COME IN DURING THE PERIOD 5 AUGUST THROUGH 1 NOVEMBER. AS BEFORE, A FEW TITLES HAVE BEEN OBTAINED FROM SECONDARY SOURCES, BUT THESE MAKE UP LESS THAN FIVE PER CENT OF THE TITLES LISTED. LIKE THE PREVIOUS LISTS, THIS ONE IS PHOTO-OFFSET REPRODUCTION FROM COMPUTER PRINTOUT.

ONE POINT THAT HAS NOT BEEN EMPHASIZED TO DATE IS THAT THE VAST MAJORITY OF LISTED PAPERS IS IMMEDIATELY AVAILABLE TO US. WE ARE BASED AT ONE OF THE GREATEST (AND LIKELY THE MOST ACCESSIBLE) HERPETOLOGICAL LIBRARIES OF THE WORLD. WE DO NOT ANTICIPATE BEING READY TO ACT AS A BIBLIOGRAPHIC SERVICE FOR ANOTHER YEAR. HOWEVER, IF YOU ARE REALLY STUCK FOR A REFERENCE, LET US KNOW: WE WILL SEE WHAT WE CAN DO.

FUTURE: TO THIS DATE THE CURRENT LIST OF TITLES HAS BEEN NO MORE THAN THAT. HOWEVER, WE HAVE BEGUN TO CROSS-INDEX THE 1968 LITERATURE FOR ACCESS THROUGH TAXONOMIC, GEOGRAPHIC, AND SUBJECT AVENUES. WE DO NOT ANTICIPATE PUBLISHING THIS INDEX BUT INSTEAD ARE ATTEMPTING TO COORDINATE OUR EFFORTS WITH BIOLOGICAL ABSTRACTS AND ZOOLOGICAL RECORD. BOTH OF THESE INSTITUTIONS HAVE INDICATED AN INTEREST IN COORDINATING THE INFORMATION OBTAINED HERE WITH THAT DERIVED FROM THEIR OWN SOURCES AND WE ARE EXPLORING THE VARIOUS POSSIBILITIES.

ACKNOWLEDGMENTS: THIS LIST WAS PREPARED WITH THE AID OF THE HERPETOLOGY DEPARTMENT AND THE LIBRARY OF THE MUSEUM, AND THE DEPARTMENT OF ZOOLOGY AND THE COMPUTER LABORATORY OF THE UNIVERSITY OF RHODE ISLAND. WE ARE ESPECIALLY GRATEFUL FOR THE HELP OF JAMES E. BRADLEY AND HARLAN S. HERSEY OF THE COMPUTER LABORATORY. SEVERAL COLLEAGUES HAVE AIDED BY BRINGING ADDITIONAL LITERATURE TO OUR ATTENTION. FOREMOST AMONG THESE IS JAMES. A. PETERS, WHO HAS FORWARDED NEARLY TWO HUNDRED REPRINTS TO US FOR INCLUSION. OTHER VALUABLE AID HAS BEEN PROVIDED BY GEORGE J. JACOBS (GOVERNMENT PUBLICATIONS), DAVID B. WAKE (OBSCURE JOURNALS), AND SHERMAN A. MINTON (MEDICAL JOURNALS). TOBY F. SHAMAN HAS JOINED THE PROJECT RECENTLY, WHILE RICHARD G. ZWEIFEL AND MARGARET S. SHAW, ALSO OF THE DEPARTMENT OF HERPETOLOGY, HAVE AIDED THE PROJECT IN MANY SPECIAL WAYS. NAO SAITO AND ROBERT J. WINTER OF THE DEPARTMENT OF ICHTHYOLOGY, HAVE BEEN VERY HELPFUL WITH TRANSLATIONS FROM ORIENTAL AND SLAVIC JOURNALS. WE ARE GRATEFUL FOR ALL OF THIS HELP. THE PROJECT IS SUPPORTED BY THE NATIONAL SCIENCE FOUNDATION (NSF GN-707).

THREE LISTS ARE GIVEN BELOW: 1) CURRENT TITLES FOR 1968, 2) A FINAL LIST OF TITLES FOR 1967, AND 3) A LIST OF JUNIOR AUTHORS. *** (SEE NOTE AT END.)

CURRENT TITLES FOR 1968

ACEVEDO GONZALEZ,MANUEL
1968 ESTUDIO ESPELEOLOGICO DE LA CUEVA DEL VAHO O BAO, BOCA DE JARUCO, HABANA
MEM FAC CIENC UNIV HABANA (BIOL) 1(5)1:33-54, 13 FIG. (ENG SUMM)

ADLER,RICHARD
1968 ANOTHER METHOD OF FEEDING CAPTIVE SNAKES
HERP 4(5):19.

AGRAWAL,VINOD
1968 ON SOME TREMATODE PARASITES OF AMPHIBIA FROM LUCKNOW
REV BIOL TROP 15(1):1-11, 8 FIG.

AISENSTADT,T.B. AND T.A.CETTLAFF
1968 THE FINE STRUCTURE OF THE FROG'S OOCYTE AT THE MATURATION PERIOD
TSITOLOGIA 10(7):789-797, 4 FIG. (RUSS, ENG ABSTR)

ALBUQUERQUE,E.X., S.H.CHUNG AND D.OTTOSON
1968 TETRODOTOXIN ON THE ISOLATED MUSCLE SPINDLE OF FROG
FED PROC 27(2):407. (ABSTR)

ALLEN,ANDREW
1968 USES OF THE GREENHOUSE IN REPTILE KEEPING
AQUARIST AND PONDKEEPER 33(5):495.

ALLEN,JOHN H.
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ANN LIMNOL 4(1):113-131, 5 FIG. (FR., ENG ABSTR)

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ANON
1968 CANEBRAKE RATTLESNAKE
WILDL N CAROLINA 32(8):1, 3, COL PL.

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1968 A CONSERVATION SYMBOL FOR AUSTRALIA
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CIENC NATUR 9(1):63-64, 1 TAB.

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RALPH N.PHILBRICK (ED), 1967
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FLA WILDLIFE 22(3):2, ILL.

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1968 SNAKE PARK
EAST CAPE NAT 1968(34):27-28, 1 FIG.

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1968 TURTLE HATCHING
ANIMALS 10(9):395.

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EIWEISSSTOFFWECHSEL BEI DER EXTREMITAETENREGENERATION
DER URODELEN
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24 FIG., 3 TAB. (ENG ABSTR)

APPLEBY,LEONARD
1968 THE SUN-WORSHIP OF THE ADDER
COUNTRY LIFE 1968:693-694, 6 FIG.

ARCHER,W.H.
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SYSTEM BEIM SALAMANDER (SALAMANDRA SALAMANDRA UND
S. TIGRINUM)
Z ZELLFORSCH 89(3):371-409, 16 FIG. (ENG SUMM)

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ZH EVOL BIOKHIM FIZIOL 4(2):128-136. (RUSS)

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SVILUPPO DEL MESENCEFALO IN ANFIBI
ATTI ACCAD NAZ LINCEI (RENDIC SCI) 43(6):608-614,
1 FIG., 1 TAB., 1 PL.

BAGNARA,JOSEPH T., JOHN D.TAYLOR AND MAC E.HADLEY
1968 THE DERMAL CHROMATOPHORE UNIT
J CELL BIOL 38(1):67-79, 9 FIG.

BAKER,A.B.
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BALLINGER,ROYCE E. AND CHARLES O.MCKINNEY
1968 OCCURRENCE OF A PATTERNLESS MORPH OF CNEMIDOPHORUS
HERPETOLOGICA 24(3):264-265, 1 FIG.

BALLS,M. AND L.A.RUBEN
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PROGR EXP TUMOR RES 10:238-260, 4 FIG.

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OF THE KIDNEY OF TARENTOLA ANNULARIS
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IN SOUTH CENTRAL COLORADO
SSAR ANN MEETING 1968. (ABSTR) MIMEO

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P. 35-102, 24 FIG., IN, T.DOBZHANKSY, M.K.HECHT AND
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1968 THE ROLE OF SODIUM CHLORIDE IN THE PROCESS OF
INDUCTION BY LITHIUM CHLORIDE IN CELLS OF THE RANA
PIPIENS GASTRULA
J EMBRYOL EXP MORPHOL 19(3):387-396.

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1968 LA SEROTONINE DANS LE REGNE ANIMAL
REV QUEST SCI 139(3):379-399, 3 FIG., 3 TAB.

BEAMISH,TONY
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ANIMALS 10(12):548-553, ILL. (SOME COL)

BECKLUND,WILLARD W.
1968 TICKS OF VETERINARY SIGNIFICANCE FOUND ON IMPORTS
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J PARASITOL 54(3):622-628, 1 TAB.

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1968 THE EFFECTS OF HYDROCORTISONE ON THE BLOOD OF
TADPOLES AND FROGS, RANA CATESBEIANA
BIOL BULL (PENNA) 135(1):92-95, 1 TAB.

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1968 CHARACTERIZATION OF ADRENERGIC RECEPTORS CONTROLLING
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J ARIZONA ACAD SCI 5:18. (ABSTR)

BENTLEY,P.J.
1968 ACTION OF AMPHOTERICIN B ON THE TOAD BLADDER:
EVIDENCE FOR SODIUM TRANSPORT ALONG TWO PATHWAYS
J PHYSIOL (CAMBRIDGE) 196(3):703-711, 4 FIG., 2 TAB.

BERCHTOLD,JEAN-PIERRE
1968 ULTRASTRUCTURE DES CELLULES INTERRENALES D'UN
AMPHIBIEN URODELE, LA SALAMANDRE TACHETEE (SALAMANDRA
SALAMANDRA L.)
COMPT REND ACAD SCI (PARIS) D 266(25):2345-2346, 7 FIG.

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IZV AKAD NAUK TURKM SSR SER BIOL 1968(2):75-80, 3 FIG. (RUSSIAN)

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1968 MORPHOLOGY OF THE F1 GENERATION OF VARIOUS CROSSES WITHIN RANA ESCULENTA-COMPLEX
ACTA ZOOL CRACOV 13(13):301-324, 8 FIG., 4 TAB., 1 PL.

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1968 EFFECT OF ESTROGEN ON THE VOCAL SAC PIGMENTATION, THROAT COLOURATION AND THE NATURE OF CROAKING IN THE TOAD (BUFO MELANOSTICTUS) DURING BREEDING SEASON
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1968 INDUCTION OF GONADAL MATURATION FOLLOWED BY THROAT SKIN COLOURATION AND VOCAL SAC PIGMENTATION IN IMMATURE MALE TOADS (BUFO MELANOSTICUS) BY CHORIONIC GONADOTROPHIN
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1968 THE ANEUPOLYPLOID COMPLEMENT OF CERATOPHRYS ORNATA
J HEREDITY 59(3):183-186, 4 FIG., 1 TAB.

BIRKS,R.I. AND M.W.COHEN
1968 THE ACTION OF SODIUM PUMP INHIBITORS ON NEUROMUSCULAR TRANSMISSION
PROC ROY SOC B 170(1021):381-399, 13 FIG., 1 TAB.

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PROC ROY SOC B 170(1021):401-421, 10 FIG., 1 TAB.

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BIOCHEM J 108(5):31P. (ABSTR)

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1968 THE ACTION OF ETHACRYNIC ACID ON SODIUM EFFLUX FROM SINGLE TOAD OOCYTES
J PHYSIOL (CAMBRIDGE) 196(3):693-701, 9 FIG., 1 TAB.

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WOCHE 1968(41):16-18, ILL. (COLOR)

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1968 A NEW ARBOREAL PIT VIPER OF THE GENUS BOTHROPS FROM THE ISTHMUS OF TEHUANTEPEC, MEXICO
AMER MUS NOVITATES (2341):1-14, 3 FIG., 1 TAB.

BOGERT,CHARLES M.
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ANN REP AMER MUS NAT HIST (99):33-36.

BOGERT,CHARLES M.
1968 THE VARIATIONS AND AFFINITIES OF THE DWARF BOAS OF THE GENUS UNGALIOPHIS
AMER MUS NOVITATES (2340):1-26, 8 FIG., 2 TAB.

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1968 THE ROLE PLAYED BY LIGHT OR DARK IN CRYSTALLINE LENSE REGENERATION OF TRITURUS TAENIATUS
DOKL AKAD NAUK SSSR 180(6):1500-1503, 4 FIG., 1 TAB. (RUSS)

BOTH,N.J.DE
1968 TRANSPLANTATION OF AXOLOTL HEADS
SCIENCE 162(3852):460-461.

BOURKE,D.O'D
1968 A TOAD TRAP
NIGERIAN FIELD 33(3):143.

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1968 SURFACE MORPHOLOGY OF FROG STRIATED MUSCLE AS PREPARED FOR AND EXAMINED IN THE SCANNING ELECTRON MICROSCOPE
J PHYSIOL (CAMBRIDGE) 197(1):10P-11P, 1 FIG. (ABSTR)

BRADBURY,M.W., HELEN BAGDOYAN, ALICE BERBERIAN AND C.R.KLEEMAN
1968 EFFECT OF EXTRACELLULAR OSMOLARITY ON CELL WATER AND ELECTROLYTES IN THE ISOLATED FROG BRAIN
FED PROC 27(2):233. (ABSTR)

BRADSHAW,S.D. AND A.R.MAIN
1968 BEHAVIOURAL ATTITUDES AND REGULATION OF TEMPERATURE IN AMPHIBOLURUS LIZARDS
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PROGRAM OF THE FINAL PUBLIC EXAMINATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY. UNIV KANSAS GRADUATE SCHOOL. P. 1-4.

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TYRYSHKINA,E.M.
1968 SIGNIFICANCE OF ACETYLCHOLINE FOR OLFACTORY MECHANISM IN AMPHIBIAN
FIZIOL ZH SSSR 54(9):1010-1017, 5 FIG.
(RUSS, ENG ABSTR)

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1968 GRANULATED UNMYELINATED NERVE FIBERS IN THE PINEAL REGION OF ANURANS
Z ZELLFORSCH 90(3):389-402, 10 FIG. (GERM)

UIBLE,HOWARD E.
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ANIMALS 10(11):510-513, ILL. (SOME COLOR)

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J HEREDITY 59(4):235-240, 8 FIG., 1 TAB.

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TSITOLOGIA 10(6):717-721, 3 FIG., 2 TAB.
(RUSS, ENG ABSTR)

VAN DER KLOOT,WILLIAM G.
1968 THE EFFECT OF DISRUPTION OF THE T-TUBULES ON CALCIUM EFFLUX FROM FROG SKELETAL MUSCLE
COMP BIOCHEM PHYSIOL 26(1):377-379, 1 FIG.

VAN PEENEN,P.F.D. AND T.L.BIRDWELL
1968 COCCIDIAN PARASITES OF THE CALIFORNIA BANDED KING SNAKE, LAMPROPELTIS GETULUS CALIFORNIAE
PARASITOLOGY 58:349-354, 3 FIG.

VANNINI,E. AND ANNA STAGNI
1968 REPRESSION BY PUROMYCIN OF TESTOSTERONE-INDUCED SEX REVERSAL IN RANA DALMATINA TADPOLES
EXP CELL RES 50(3):683-687, 8 FIG.

VANZOLINI,P.E.
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PAPEIS AVULSOS ZOOL 21(23):231-241, 2 FIG., 6 TAB., 1 MAP.

VANZOLINI,P.E.
1968 GEOGRAPHY OF THE SOUTH AMERICAN GEKKONIDAE (SAURIA)
ARQ ZOOL (S PAULO) 17(2):85-111, 5 MAPS.

VIRGINIA HERPETOLOGICAL SURVEY
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VIRGINIA HERPETOL SOC BULL (58):1-7.

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REV BIOL TROP 15(1):13-115, 36 FIG., 18 TAB.

VICK,J.A., C.R.ROBERTS AND M.H.HEIFFER
1968 PHARMACOLOGICAL EFFECTS OF LETHAL DOSES OF SNAKE VENOM
FED PROC 27(2):707. (ABSTR)

VILLA,J.D.
1968 A NEW COLUBRID SNAKE FROM THE CORN ISLANDS, NICARAGUA
REV BIOL TROP 15(1):117-121, 4 FIG.

VILTER,V.
1968 HISTOCHIMIE QUANTITATIVE DES SECRETIONS MUCIPARES ACIDES DE L'OVIDUCTE MATURE DE SALAMANDRA ATRA DES ALPES VAUDOISES
COMPT REND SEANC SOC BIOL 162(1):76-80, 2 FIG.

VINOGRADOVA,N.A.
1968 DISTRIBUTION OF NON-PENETRATING SUGARS IN THE FROG'S SARTORIUS MUSCLE UNDER HYPO- AND HYPERTONIC CONDITIONS
TSITOLOGIA 10(7):831-838, 5 FIG. (RUSS, ENG ABSTR)

VINOGRADOVA,N.A., N.N.NIKOLSKY AND A.S.TROSHIN
1968 THE EXTRACELLULAR SPACE IN THE FROG SARTORIUS MUSCLE
TSITOLOGIA 10(7):822-830, 3 FIG. (RUSS, ENG ABSTR)

VOGEL,ZDENEK
1968 NEUE ERGEBNISSE UEBER DAS VORKOMMEN DER AESKULAPNATTER (ELAPHE LONGISSIMA /LAURENTI/) IN DER TSCHECHOSLOWAKEI
ZOOL GARTEN (NF) 35(3):166-178, 7 FIG.

VOITKEVICH,A.A. AND I.I.DEDOV
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DOKL AKAD NAUK SSSR 181(3):765-768, 2 FIG.

VOLPE,E.PETER AND SHERILL CURTIS
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SCIENCE 161(3839):396-397.

VOLPE,E.PETER AND BRYAN M.GEBHARDT
1968 SOMATIC CHROMOSOMES OF THE MARINE TOAD, BUFO MARINUS (LINNE)
COPEIA 1968(3):570-576, 4 FIG.

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1968 AMPHIBIA, P. 20-24, 4 FIG., IN, REGINALD WAGSTAFFE AND J.HAVELOCK FIDLER, THE PRESERVATION OF NATURAL HISTORY SPECIMENS. VOL. 2. ZOOLOGY-VERTEBRATES, BOTANY, GEOLOGY. H.F. AND G.WITHERBY LTD, LONDON.

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1968 THE PRESERVATION OF NATURAL HISTORY SPECIMENS. VOL. 2. ZOOLOGY-VERTEBRATES, BOTANY, GEOLOGY. H.F. AND G.WITHERBY LTD, LONDON. XV + 404 P., 150 FIG.

WAKE,MARVALEE HENDRICKS
1968 THE COMPARATIVE MORPHOLOGY AND EVOLUTIONARY RELATIONSHIPS OF THE UROGENITAL SYSTEM OF CAECILIANS
(AVAIL. UNIV. MICROFILMS, ANN ARBOR, MICH. ORDER NO. 68-10,256)
DISS ABSTR B 29(1):419.

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GEOL MAG 105(1):1-14, 3 FIG.

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AMER MIDLAND NAT 80(1):1-27, 1 FIG., 10 TAB.

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CAN J BIOCHEM 46(8):953-959, 4 FIG.

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FED PROC 27(2):233. (ABSTR)

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PROC SOC EXP BIOL MED 128(3):853-856, 2 FIG., 2 TAB.

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68 FARBVERAENDERUNGEN BEI CALOTES?
AQUAR TERR 15(8):281.

WEIMANN,J.N.
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ANN REP PORT ELIZABETH MUS 1967:11-12, 1 FIG.

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ACTA BIOL ACAD SCI HUNG 19(1):83-96, 12 FIG.

WERNER,YEHUDAH L.
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HERPETOLOGICA 24(3):238-242, 3 FIG.

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HERPETOLOGICA 24(3):233-237, 1 FIG., 2 TAB.

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TOXICON 6(1):73-74, 2 TAB.

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J PHYSIOL (CAMBRIDGE) 197(3):685-707, 9 FIG., 5 TAB.

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J EMBRYOL EXP MORPHOL 19(3):363-385, 10 FIG.

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1968 ELECTRICAL SIGNS OF NEW MEMBRANE PRODUCTION DURING CLEAVAGE OF RANA PIPIENS EGGS
J GEN PHYSIOL 52(3):509-531, 12 FIG.

WORTHINGTON,RICHARD C.
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HERPETOLOGICA 24(3):242-246, 1 FIG.

WUENDSCH,L., W.HIMSTEDT AND H.BORNSCHEIN
1968 E- UND I-NETZHAEUTE VON URODELEN
EXPERIENTIA 24(7):731-733, 2 FIG.

YIAMOUYIANNIS,J.A. AND J.A.CAIN
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J NEUROCHEM 15(7):673-676.

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1968 THE EFFECT OF WEIGHTLESSNESS ON THE DIVIDING EGG OF RANA PIPIENS
BIOSCIENCE 18(6):609-615, 7 FIG., 3 TAB.

ZAFFAGNINI,FULVIO
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ARCH ITALIANO ANAT EMBRYOL 73(2):99-113, 15 FIG.
(ITAL, ENG ABSTR)

ZAPPALORTI,ROBERT
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HERP 5(1):14-18.

ZEILLER,WARREN
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DRUM AND CROAKER 68(3):27-30, 1 TAB.

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ENGELHARDTIA 1(3):28.

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BULL FLA STATE MUS 12(4):185-211, 6 FIG., 4 TAB.

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BULL AMER MUS NAT HIST 140(1):1-64, 21 FIG., 10 TAB., 2 PL.

ZWICK,H. AND A.M.GRANDA
1968 BEHAVIORALLY DETERMINED DARK ADAPTATION FUNCTIONS IN THE TURTLE, PSEUDEMYS
PSYCHONOMIC SCI 11(7):239-240, 3 FIG.

FINAL LIST OF TITLES FOR **1967**

AGARKOV,G.B. AND V.I.BUROVA
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FED PROC 26(2):403. (ABSTR)

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COPEIA 1967(3):596-604, 2 FIG.

ALEXANDRE,H.
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BULL CL SCI ACAD ROY BELG (5)53:1088-1105, 7 FIG.

ALFORD,DON B.
1967 CLEMMYS MUHLENBERGI
BULL CHICAGO HERPETOL SOC 2(4):1.

ALVAREZ,TICUL AND ELIEZER MARTIN
1967 DESCRIPCION DE UNA NUEVA ESPECIE DE PSEUDOEURYCEA DE OAXACA MEXICO (AMPHIBIA:CAUDATA)
ACTA ZOOL MEX 9(1):1-9, 2 FIG., 1 TAB.



herpetological REVIEW

NUMBER 5 / DECEMBER 1968

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles.

SEE PAGE 10 OF THIS ISSUE

FOR DUES INFORMATION

HERPETOLOGICAL REVIEW

Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor.

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number 5 • december 1968

EDITOR - JOSEPH T COLLINS

•CONTENTS

3 Report on SSAR Mountain Lake Meeting

6 Terra Alta Biological Station, by William Aston

8 Book Review: The Preservation of Natural History Specimens, Volume 2, Vertebrates, Botany, and Geology (Joseph T. Collins)

8 New Books and Reprints

9 Book Review: Amphibians of Malawi, by Margaret M. Stewart (Arthur Loveridge)

10 Book Review: Living Turtles of the World, by Peter C. H. Pritchard (George R. Zug)

10 Increase of SSAR annual dues for 1969

11 Current Herpetological Titles IV: 1968, by H. G. Dowling, Itzchak Gilboa, and Irene Palser

51 Future SSAR Meetings

▲▲▲▲

REPORT ON SSAR MOUNTAIN LAKE MEETING

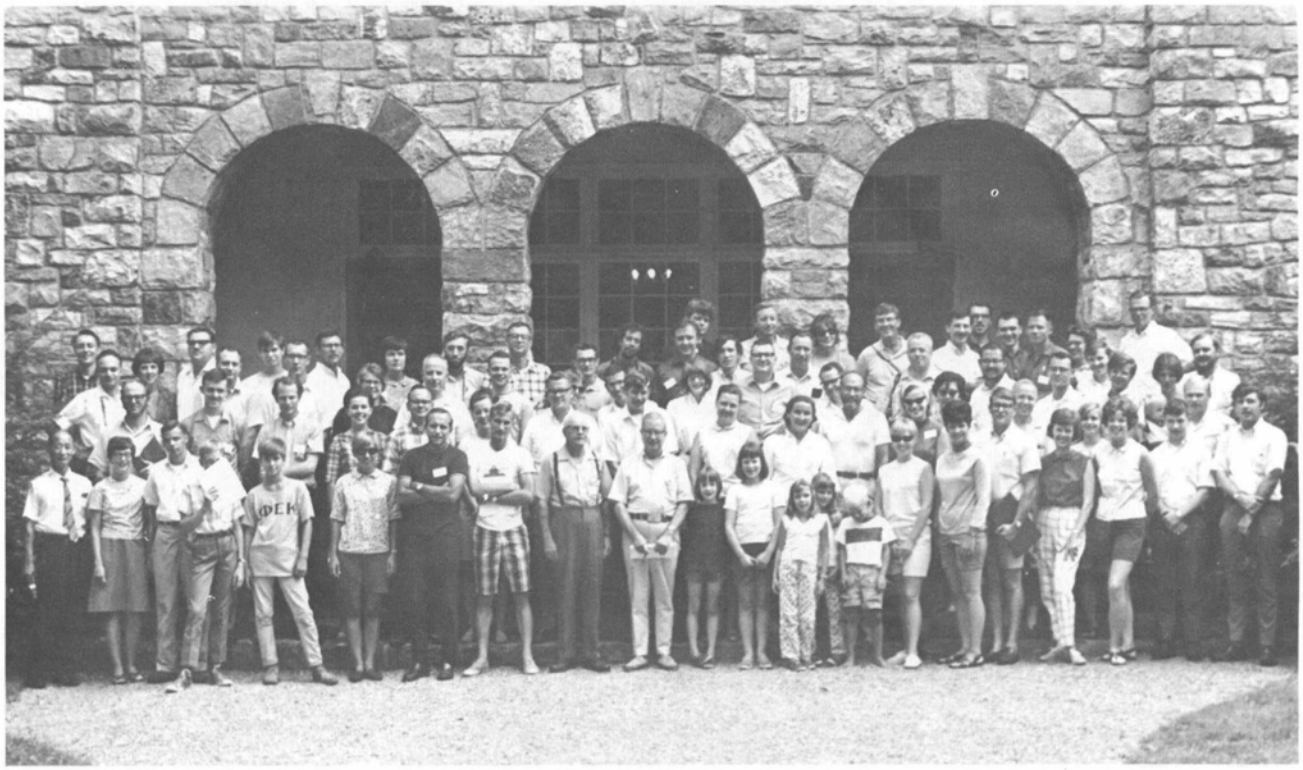
The Society's eleventh annual meeting was held at the University of Virginia's Mountain Lake Biological Station in the Appalachian Mountains near Blacksburg, Virginia, on 23-25 August 1968. The cool climate at 4000 feet and the relaxed atmosphere of the sessions combined to make this perhaps the most enjoyable of all Society meetings. A total of 92 persons attended.

The Board of Directors and the Editorial Board met Friday evening; Chairman N. Bayard Green presided. Present for the Board meeting were: Chairman Green, Joseph T. Collins, Henri C. Seibert, Lowell P. Orr, James C. List, Robert E. Gordon, Barry D. Valentine, J. P. Kennedy, Kraig K. Adler, George R. Zug; James Organ and Herndon G. Dowling were visitors. After hearing a report by Dowling on computerized literature lists, the Board moved to (1) increase dues for 1969, (2) appoint a committee to revise the Constitution, and (3) copyright Journal of Herpetology several budgetary items were also discussed. Concurrently, behavioral films were being shown in the Station's auditorium and an evening field trip to Wind Rock was held.

Herndon Dowling and James Vial presided over the paper sessions on Saturday, including invited lectures by Richard Highton and Carl Gans (abstracts appear in the Journal of Herpetology 2(3-4), 1968). In the evening, a party was held and additional behavioral films were shown. On Sunday, two field trips were held: (1) an all-day trip to Whitetop-Mt. Rogers, and (2) a local trip to the "Cascades" (see Herpetological Review no. 2, 1968).

Several exhibits were open throughout the course of the meeting. The live specimens exhibit, organized by Harry Jopson, included representatives of most Appalachian species of reptiles and amphibians, including all three genera of desmognathine salamanders. The photographic display included over 150 color and black-and-white photographs from sixteen sources. Franklin Tobey of the Virginia Herpetological Society exhibited his Society's detailed distribution maps for Virginia reptiles and amphibians.

The Society wishes to publicly thank those institutions and individuals who contributed to the success of this meeting. First, to the authorities



1968 MEETING GROUP PHOTOGRAPH. Left to right, ROW 1: Hajime Fukada, Margaret Harrison, Julian Harrison, Scott Highton, Blase Bickett, Patricia Forster, Gordon Forster, Claire Zurbuch, Glenn Gentry, Bayard Green (Society Chairman), Sylvia Organ, Linda Organ, Susan Valentine, Nancy Valentine, Jon Zug, Pat Zug, Maxine Stotler, Chris Stotler, Joan List, Barbara List, Douglas Scherzer, Kraig Adler (Society Editor of Facsimile Reprints). ROW 2: Joseph T. Collins (Society Secretary-Treasurer), Philip Carter, Stevan Arnold, Gerry Orr, Lowell Orr (Society Director), Barbara Maple, Ray Ashton, George Zug (Society Index Editor), Della Organ, Buena Valentine, Barry Valentine, Dolores Adler, Mabel Gans, James List (Society Associate Publications Secretary), Sarah Freeman, Howard Freeman (with Elaine Freeman in arm). ROW 3: Yehudah Werner, Richard Highton, Ralph Pfingsten, Linda Pfingsten, Franklin Tobey, William Maple, Barbara Bayless, Laurence Bayless, Caroline Huheey, James Huheey, Benjamin Banta, Carl Gans, Jack McCoy, Charles Mueller, Olav Oftedal, Linda Dennis, David Dennis. ROW 4: James Organ (Meeting Co-Chairman), Susan Woods, John Woods, Tim Bickett, Dan Swihart, Margaret Stewart, Jack Brooks, Gene Schroeder, Michael Sebetich, Steven Weinkselbaum, Michael Hrynko, Pat Kennedy (Society Editor of the Journal), Peter Mundel, Herndon Dowling, Henri Seibert (Society Publications Secretary), Madlyn Dowling, Robert Gordon, Norton Rubenstein, Tom Scanlon, Steve Tilley, Bill Brode, Mary Tilley, Jim Stewart, Harry Jopson (Meeting Co-Chairman). Present but not in photograph: Marvin Bobes, Hazel Borin, John Caruso, Lloyd Fitzpatrick, Carl Freeman, Helen Gentry, Lyford Greene, Barry Hinderstein (photographer), Mary List, David Snyder, Juanita Snyder, James Vial. Total, 92 persons.

of the University of Virginia, particularly the Station's directors, J. J. Murray, Jr. and James L. Riopel, for their untiring efforts and courtesy to us. Second, to the co-chairmen of the meeting committee, James Organ and Harry Jopson, who, more than anyone else, deserve our gratitude, and to the members of their committee, Stevan Arnold, Alice Makielski, and Kraig Adler. Our thanks also, to the invited lecturers, Drs. Highton and Gans, and to their discussants, Robert Gordon and George Zug. The Institut für Wissenschaftlichen Film (Göttingen), Edward W. Dempsey (Columbia University), E. C. Amoroso (Royal Veterinary College, London), and The University of Michigan kindly loaned the films. Finally, to those whose photographs generated lively discussions, our thanks for their time in preparing their reproductions for the meeting; these persons were Charles Mohr, Margaret Stewart, Ralph Sinclair, Isabelle Hunt Conant, Sherman and Madge Minton, Stephen Tilley, Glenn Gentry, Robert Mertens, Hajime Fukada, James Organ, George Nace, Dale Hoyt, James Huheey, Harry Jopson, Lowell Orr, and Kraig Adler.

more from mountain lake



Herndon Dowling (left) and Glenn Gentry enjoy the pleasant surroundings.



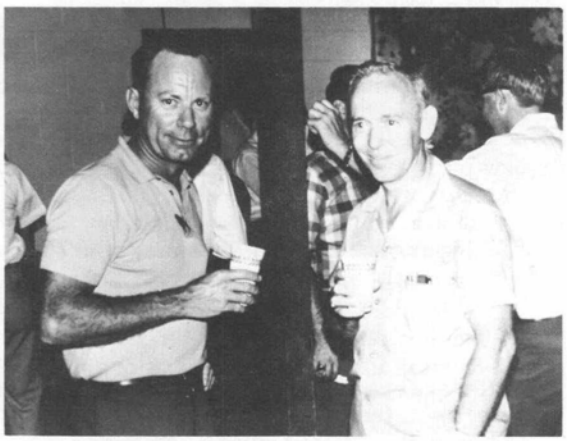
Carl Gans (left) and Hajime Fukada prepare to photograph the varied and beautiful landscape at Mountain Lake.



A crowd awaits further photo instructions in front of the Main Laboratory Building at Mountain Lake.



N. Bayard Green (sitting), Richard Highton (center-standing), and Harry Jopson (Meeting Co-Chairman) relax in the woodland setting of the Biological Station at Pembroke, Virginia.



Our "informal" Saturday night get-together offers a convivial atmosphere as well as refreshment to Jim Vial (left) and Jim List.

TERRA ALTA BIOLOGICAL STATION

Biological stations are becoming an important part of universities throughout the country and West Virginia University's Terra Alta Biological Station (TABS) has the potential of becoming one of the finest.

A biological station is a rather odd creature -- it's only a place to eat, sleep and study but good ones are hard to find. The key to a good station is location, and TABS seems to have found one of the best in the East.

A good location for a biological station means one that is close to a wide variety of plants and animals in their natural state. A zoo or an arboretum is adequate for special purposes; but biology students need to visit a great variety of nature's living laboratories.

Within an hour's drive from TABS there is a mountain-top swamp at Cranesville, native cacti along Patterson Creek in Mineral County, a virgin forest at Cathedral State Park and the wild Cheat River.

TABS is on a 67-acre tract about a mile from Terra Alta, Preston County, and is at an elevation of 2, 625 feet (1, 800 feet higher than Morgantown). Plants and animals at the station are typical of the mid-Appalachian region.

WVU's Department of Biology has been conducting summer field courses since 1926, but until it moved to Terra Alta in 1962 there was no permanent station. Since that time a modest but steady building program has been under way.

Last year a new laboratory, a restroom and shower facility and a Maine Cedar Log residence building were erected. This year a new recreation shelter and a complete building renovation were accomplished.

"TABS has adequate facilities for teaching -- what we need now is some space for research and faculty housing," observed Professor Robert L. Birch, director of TABS.

The need for faculty housing results from a new policy of inviting professors from other schools to teach courses. Recruiting visiting professors for summer courses is usually easy, but without housing for their families, many won't accept an appointment.

Research facilities at TABS are needed to meet the demands of WVU graduate students and staff and to provide space and equipment for post-doctoral research workers from other universities. Many want to spend the summer on studies related to this rather unique area.

This summer the curriculum was expanded from a single five-week session to two five-week sessions. In the first session Professor W. Newman Bradshaw gave a course in field ecology and Professor Patrick J. Kennedy of the University of Texas gave a course in herpetology.

In the second session Professor Charles H. Baer gave a course on plant communities and Professor Birch conducted field studies on invertebrates. Research in botany and zoology was performed by graduate students during both sessions.

One of the most interesting living laboratories in the TABS area is the Cranesville Swamp Nature Sanctuary. To the uninitiated it looks like a formidable swamp. But to a biologist or an interested layman, it's a living museum.

The swamp includes examples of northern coniferous (pines, spruce, etc.) forests surrounded by the typical hardwood (trees with broad leaves that fall in autumn) forests of mid-Appalachia. Coniferous forests lie between the tundra and the hardwoods and during the Ice Age, 10 to 25 thousand years ago, they retreated southward.

As the ice sheets melted the conifers moved back north and except in a few cases in mid-Appalachia, as at Cranesville, were replaced by the hardwoods. Other examples of these Ice Age islands are Cranberry Glades in Pocahontas County and Canaan Valley in Tucker County.

Cranesville Swamp lies at an altitude of 2, 500 feet and is situated in a bowl-shaped valley where cold-air drainage produces a natural frost pocket -- frost has been recorded there in July and August. But these two factors alone wouldn't have prevented the hardwoods from taking over.

Professor Kennedy, who was the first visiting professor to teach at TABS, and his group found a mountain earth snake (Virginia valeriae pulchra), the second recorded mountain earth snake found in West Virginia (the first was found in 1966).



This mountain earth snake (Virginia valeriae pulchra) is only the second specimen of the sub-species found in West Virginia. It was discovered by the herpetology class working at West Virginia University's Terra Alta Biological Station this summer.

The other factor at Cranesville is the boggy conditions, which are unfavorable to hardwoods. The swamp developed as Muddy Creek, the main drainage stream in the area, cut downward to a layer of rock that slowed down the normal rate of erosion. The rock, which is called Pottsville Conglomerate, thus formed a natural dam and prevented good drainage.

Muddy Creek gets back to normal a few miles from the swamp when it falls about 60 feet. Unfortunately, many visitors to the area are unaware of Muddy Creek Falls and spend their time looking at Swallow Falls which are only 40 feet high.

The swamp is about eight miles north of TABS and straddles the West Virginia-Maryland line. It covers about 550 acres and from an economic standpoint it's virtually worthless. But as a sample of wild land, it's priceless -- nature isn't making any new ones.

The Nature Conservancy, a non-profit educational and scientific group, took the first step to preserve the swamp when it purchased 259 acres in 1960. This part of the swamp is administered by the WVU Arboretum under an agreement that specifies that the area will be maintained in its natural condition. Since 1960, about 16 additional acres were purchased by the Nature Conservancy and plans are under way to acquire the remaining acreage and preserve the entire swamp. The area was designated a natural history landmark by the U. S. Department of the Interior in 1965.

Eastern larch (tamarack) is the outstanding species of trees stranded in the swamp. Unlike most conifers, the larch sheds its needles in autumn. The needles are blue-green in the summer, but before they fall they turn a bright golden yellow. This is very unusual among conifers.

The large cranberry grows in the open, wet sections of the swamp. This is the same species that is sold in stores and according to one report they are sweeter than the cultivated ones. Among the cranberries a careful observer can find round-leaved sundew, a little plant that digests bugs caught on its sticky leaves.

Animals as well as plants reflect the harsh northern climate of the swamp. One of the most interesting is the northern water shrew, a small mouse-like mammal about two inches long and weighing about as much as a penny. Shrews are distinguished from mice by their long pointed snouts and pointed orange teeth.

With the aid of stiff bristles on the toes of its hind feet and its tremendous speed, the water shrew is able to run considerable distances over the water.

This ability seems to aid them in satisfying their voracious appetite. It is reported that a hungry shrew can eat the equivalent of its own weight every three hours. If a food shortage appears, they will devour their own kind and attack other animals many times their own size. Cranesville Swamp and the Williams River in Pocahontas County are the two most southern locations for this species in the East.

According to Dr. Bradshaw, shrews are the most abundant mammal in the state. But they are chiefly nocturnal and so secretive that they are seldom seen except by someone specifically looking for them. There are six species of them in West Virginia, the most common of which is the short-tail shrew. There is no record of any of them ever being tamed.

Visitors are welcome at the Cranesville Sanctuary, but they should remember to leave the bugs and the flowers and the cranberries for the water shrews, they might get hungry.

Another example of a living laboratory is situated a few miles from WVU's Biological Station. From the road it looks like an excellent place to throw beer bottles -- there is evidence that some citizens think this. A few yards inside it turns into a magnificent rock garden.

The garden is a two-acre exposure of Pocono Sandstone partly covered with stunted, undernourished plants and trees. Most gardeners would reject every species there, but mother nature has work for all of them.

Sometime in the past -- because of an ancient act of nature, fires, man's poor farming and forestry practices or a combination of the three -- the area was swept clean of trees, plants and soil. Now, through a process known as bare-rock sucession, the area is slowly becoming an oak forest.

First, lichens grow on the bare rocks; they hold a little moisture and soon, various forms of moss start to grow at the same spot. The lichen-moss community not only retains moisture but soil that is carried by the wind or washed down from above. Once there is moisture and soil, other plants -- such as poverty grass, huckleberry and blueberry -- live and die there. This builds up the top soil and enables larger plants and trees to grow.

The first tree to grow in the area is pitch pine, but because conditions are so severe, they are stunted and often uprooted by the wind and weather. Some survive and each generation is a little stronger. Finally, there is enough top soil for oaks to grow. The oaks grow and provide shade -- for the little oaks -- but the little pines and the little huckleberries die for want of the sun. They are caught between the rock and a shady place -- but all they have to do is wait for the lichen to grow and gather a little moisture and . . . . .

In places like this a student can see in 30 minutes what teachers and books could never convey.

Doyle Blauch, a graduate student from Ohio, is writing a research paper on the area and steps are being taken to preserve this remarkable habitat for future studies and enjoyment by nature lovers as an adjunct to the West Virginia University arboretum system.

William Aston, News Service, Morgantown, West Virginia 26506.

BOOK REVIEW

The Preservation of Natural History Specimens. Volume 2. Vertebrates, Botany, and Geology. Edited by Reginald Wagstaffe and J. Havelock Fidler. 1968. xv + 404 p. with 150 text figures. Available from: Philosophical Library, Inc., 15 East 40th Street, New York, New York 10016, for $17.50.

The editors of this second volume (the first was issued in 1955 and dealt exclusively with invertebrates) on the methods of preserving natural history specimens have produced a basic, concise assemblage of techniques currently used in most museums or institutions housing preserved collections of plants and animals, both fossil and recent. For the purpose of this review, however, I will restrict my discussion to those parts of the book that have application to herpetology.

The herpetological portion of this volume is contained in three short chapters which cover, respectively, preservation of amphibians, preservation of reptiles, and the Walter Plastic Method for reproduction of reptiles and amphibians (the latter chapter written by Ronald J. Lambert). These three chapters cover only nineteen pages. In addition, there is a brief paragraph (Appendix VIII B) by Francis Wheeler on poisonous snake bite. Chapter 5, dealing chiefly with preservation of amphibians in liquid, is presented in three parts according to the developmental stage of the specimen (i.e. adult, ova and embryo, or larvae). The latter two stages are also briefly discussed in terms of microscopic preparation. The turtles, lizards, snakes, and crocodilians are similarly discussed in Chapter 6 with the exception that methods for both wet and dry preservation are presented. Also, the chapter on reptiles gives some information on curing skins of very large specimens. Chapter 7 deals with the Walter Plastic Method for reproducing life-like casts of reptiles and amphibians for use in exhibitions. Although well-written and organized by Mr. Lambert, this section would have generated more appeal if drawings and diagrams had been utilized to better illustrate some of the procedures. The extremely short section by Francis Wheeler on poisonous snake bite is perplexing. It has little to do with the objective of the book as it is titled, and its inclusion as a one-paragraph article cannot do justice to a very complicated subject.

In summary, this book will generally have limited appeal to herpetologists due to its brevity in their field of interest. Certain museum and university staff personnel, however, might find the volume useful for reference, particularly as to the procedures of the Walter Plastic Method. Also, students will be more easily instructed in methods of preserving their specimens for classroom use by reference to this book. Ultimately, however, the text will arouse little desire to own it due to its prohibitive price.

JOSEPH T. COLLINS, Museum of Natural History, University of Kansas, Lawrence 66044.

New Books & Reprints

Index to the Scientific Names in "A Popular Treatise on the Common Indian Snakes" by Frank Wall. 1905-1919. Indexed by Simon M. Campden-Main. 1968. 7 p. Available from: Smithsonian Herpetological Information Service, Division of Reptiles and Amphibians, U. S. National Museum, Washington, D. C. 20560.

Cranial Kinesis in Lizards; Contribution to the Problem of the Adaptive Significance of Skull Kinesis, by N. N. Iordansky. 1966. Zoological Journal 45(9): 1398-1410. Translated by Dr. Leon Kelso. Edited by Dr. Carl Gans. Available from: SHIS (address above).

The Caecilians of the World, by Edward H. Taylor, 1968. 848 p. Available from: University of Kansas Press, Lawrence, Kansas 66044, for $25.00.

Attempt at Application of Analysis of Variation to the Qualitative Richness of the Fauna of Terrestrial Vertebrates of the U. S. S. R., by P. V. Terent'ev. 1963. Vestnik Leningradskovo Universiteta No. 21: 19-26. Translated from Russian by Edward J. Maly. Edited by Eric Pianka. Available from: SHIS (address above).

On the Mono- or Polyphyletic Origin of Tetrapods, by E. I. Vorob'eva. 1966. Zoological Journal 45(9): 1355-1368. Translated from Russian by Frederick W. Ryan. Edited by Bruce B. Collette and James A. Peters. Available from: SHIS (address above).

Scientific Writing for Graduate Students. Edited by F. Peter Woodford. 192 pp. Fall 1968. Available from: The Rockefeller University Press, New York 10021. $5.75.

BOOK REVIEW

Amphibians of Malawi, by Margaret M. Stewart, State University of New York. 1967. x 163 p. 20 colored plates. 67 figures. Available from: State University of New York Press for $7.50.

Very reasonably priced, for with burgeoning populations and rising costs a book with such beautiful colored plates is a good investment, as any young herpetologist may point out to his demurring wife, citing Pitman's "Snakes of Uganda" which, costing only $1.10 in 1938, is now priced at $75.

In addition to her excellently reproduced colored photographs, drawings - frequently supplemented by sketches of important details and tadpoles - have been made by the gifted authoress of every one of the sixty species or races occurring in the country. Nine of this number were added as a result of the year Dr. Stewart spent in Malawi. Indeed this is a remarkable, almost unique, book commencing with its dedication "To the Children of Malawi." Anyone familiar with the country will have no difficulty in visualising the author's bright-eyed collaborators as they eagerly crowd about her with their captured frogs - commonplace creatures that have suddenly a cash value.

What impresses the present reviewer is the meticulous attention to detail displayed throughout an eminently readable book whose primary objective was "to provide a means of identification for the novice, the layman, or the student," with the modestly expressed hope that it "may also be of service to herpetologists." In both spheres the author is successful, substituting the customary jargon of the taxonomist for a pleasing versatility of expression such as "spindly legs" and "stubby fingers," adjectives that precisely describe the limbs and digits of the toad under discussion.

Amphibia, accompanied by outline drawings of a frog clearly named, are defined as "vertebrate animals with smooth skins," a definition that would appear to exclude many bufonids! Then follow sections dealing with everything pertaining to these creatures - their care in captivity, tape-recording their distinctive calls, etc. etc. Under 'collecting' we learn that the author used an ordinary landing net within a nylon bag, which seems a good idea. There is also a timely warning of the risks of contracting bilharzia when frogging in lowland Africa. If the captures are to be killed, immersion in 1% solution of chlorotone is recommended. This is certainly more humane than the alternative of a 1% solution of formalin. In view of an 8% solution of the same fluid being listed under 'preserving'; formalin's corrosive effects on metal - with subsequent damage to the specimens - should have been mentioned when stating that "plastic or metal tags provide the most permanent labels." Doubtless written when the author had only 70% ethyl alcohol in mind.

Following the Systematic Index is an originally devised key based on readily observed differences, so not necessarily corresponding to the systematic order. Time alone, and testing with different material, will reveal how well its purpose is achieved.

Dr. Stewart has examined the Malawi material in many museums, submitting specimens of questionable status to Dr. J. C. Poynton for a second opinion. With some minor adjustments she follows the nomenclature of Poynton's 1964 volume on "The Amphibia of Southern Africa," and his 1964 article on the "Amphibia of the Nyasa-Luangwa region of Africa," where certain groups (Rhacophoridae, Hyperoliidae, etc) are sensibly treated as subfamilies of the Ranidae - a world-wide revision of which is long overdue. When one comes to the admittedly unwieldy genus Rana, however, the same conservative attitude is discarded and in line with the current fashion subgenera are raised to generic status. While this may work well for African members an impression remains that it will break down when one has to deal with Asiatic species. Dr. Stewart's excellent drawings of the ten Malawi members of the confusing Ptychadena group should assist future workers to avoid the mistakes I have made.

Following the scientific and English name of each frog, Dr. Stewart provides about a dozen subheadings in such clear type as will enable the busy searcher for information to find at a glance what is available, be it VARIATION, SEXUAL DIMORPHISM, CALL, EGGS AND DEVELOPMENT, HABITS, etc., embodying a wealth of information, much of it based on her own observations. Under RECORDS Dr. Stewart lists all reliable localities while, in view of systematic collecting in Malawi being in its infancy, wisely refraining from including range maps. Under RANGE I note she has rather neatly and briefly overcome one of the recent political changes by substituting "Tanzania mainland" for Tanganyika Territory prior to its amalgamation with Zanzibar.

Residents of Malawi (formerly Nyasaland) are indeed fortunate to be provided with so reliable and readable a book, and it is permissable to hope that "The Children of Malawi" - to whom it is dedicated - may grow up in peach under the wise and pragmatic leadership of President H. K. Banda, to whose cooperation Dr. M. M. Stewart pays tribute.

ARTHUR LOVERIDGE, Varneys, Island of St. Helena, South Atlantic Ocean.

BOOK REVIEW

Living Turtles of the World, by Peter C. H. Pritchard. 288 pages. T. F. H. Publications, Inc., 1967. $9.95.

Of all the reptiles, turtles probably have the largest number of lay supporters, but surprisingly there have been no general books to cater to the interest of this audience. Mr. Pritchard's book is the first such attempt. Unlike the handbooks of Pope and Carr, his goal has been to describe all the extant species of turtles and to provide a source of general information on chelonian biology. I believe that he has successfully accomplished the former part of his goal but is much less successful for the latter part.

The bulk of "Living Turtles of the World" is devoted to the descriptions of turtle species and subspecies; essentially eight chapters and over 200 pages are involved in this task. To my amazement, these chapters are highly readable, for normally when so much space is dedicated to characterizations of species, one is lulled into sound sleep. The author is to be congratulated on his skilled manipulations of the characterizations. These descriptions should enable a reader to determine the specific identity of a turtle if he is aware of its generic allocation, for in most cases, there is insufficient information on generic determination; however, this shortcoming is readily overcome by referring to the many photographs. The book is crammed with black-and-white and color photographs which illustrate the majority of extant turtles. The quality of the photographs is usually excellent; this is especially true of the black-and-white ones. The color photographs are also very good; however, in some cases it appears that the shells were moistened before photographing to enhance the colors and patterns but instead the moisture produced large areas of glare on the shells. The placement of the color photographs usually does not correspond to the text so one is forced to leaf back and forth to discover the appropriate plate. In addition, the color illustrations of Batagur baska, Geochelone emys, and Orlitia borneensis are comical rather than helpful.

Mr. Pritchard has been less successful in his attempt to supply general information on turtles. Much of the space devoted to "general information" is concerned with nomenclatural matters and/or differentiation of races rather than to chelonian biology. For example, two-thirds of the chapter on turtle families is an historical resumé of familial classification, the tortoise section has half of the space devoted to the discovery and description of giant tortoises, and several pages of the soft-shell turtle section are devoted to the Amyda-Trionyx feud. I do not wish to imply that the above are poorly handled but rather that the space could have been more profitably used to discuss what little ecological data we have on these groups.

Unfortunately I feel that the author is frequently guilty of perpetuating misinformation or causing confusion. I believe some of the following examples will support my contention. Although there have been two relatively recent attempts to stabilize the terminology of carapacial scutes, Pritchard presents Stejneger's scheme which is sufficiently different to cause confusion anew. His statements on familial relationships are inconsistent. Even though he cites Carettochelys as a cryptodire, he evidently believes it is a pleurodire by his discussion and its origin on the cladogram from Chelidae. Dermatemys is stated as a close relative of kinosternids yet dermatemydids gave rise to emydids, and kinosternids and chelydrids arose from testudinids. Likewise his nomenclature is inconsistent; he uses one nomenclature in the text and a similar, yet distinct one, in the appendix, i.e., Emys, Emydoidea; Macrochelys, Macroclemys; P. floridana concinna, P. concinna concinna. If he didn't wish to use Sternothaerus for the musk turtles, he could have avoided confusion by likewise not mentioning it in conjunction with the sideneck Pelusios. Some of his explanations are misleading or inaccurate, i.e. "sea turtles lay the most [eggs], since these turtles are exposed to many dangers during their early existence", "[Carettochelys] is distinguished from soft-shells proper by presence of peripheral bones," or "the body was practically twisted inside-out, so that the limb girdles eventuated inside the ribs; thus was the turtle formed."

Not all is as bad as the last two paragraphs imply. The chapter on the evolution of turtles is a good introduction to the subject. There are two interesting, but unfortunately, short chapters on chelonian reproductive habits, and an entire chapter on turtle care in captivity.

In spite of my many complaints against the lack of and the inaccuracy of some of the material on chelonian biology, I wish to recommend "Living Turtles of the World" to all those who have a thing for turtles, and especially to those wanting a ready reference for identification and suggestions on care of captive specimens.

GEORGE R. ZUG, Museum of Zoology, University of Michigan, Ann Arbor 48104.

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SOCIETY'S DUES ARE INCREASED FOR 1969

At the Society's eleventh annual meeting the Board of Directors voted to increase dues for calendar 1969 as follow: Regular member (U.S. and Canada) - $6.00; Foreign member - $5.00; Sustaining member - $8.00; and institutional subscription - $10.00. Contributing membership and Life membership remain the same at, respectively, $15.00 and $100.00.



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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles. Regular dues are $4.00 worldwide and should be remitted (preferably via international money order outside the U. S. A. and Canada) to the Secretary-Treasurer. Members are invited to subscribe to the higher categories of Sustaining ($5.00), Contributing ($15.00), or Life ($100, in four payments of $25.00) membership. Institutional subscription is $6.00. A complete list of publications of The Ohio Herpetological Society and the Society for the Study of Amphibians and Reptiles is available from the Publications Secretary.

HERPETOLOGICAL REVIEW

Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor.

Herpetological Review

number 4 • september 1968

•CONTENTS

3 Proposed Symposium of AAAS Meetings

4 A Plea to Save Shelta Cave, Alabama, by John E. Cooper

4 University of Michigan Amphibian Facility

5 Book Review: The Life and History of the Side-Blotched Lizard, Uta stansburiana, by Donald W. Tinkle (Harold Heatwole)

5 New Books and Reprints

6 Doris M. Cochran (1898-1968)

6 Members Desiderata

7 Current Herpetological Titles, III: 1968, H. G. Dowling, Itzchak Gilboa, and Irene Palser

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PROPOSED SYMPOSIUM FOR AAAS MEETING

Under the direction of Victor H. Hutchison, Institute of Environmental Biology, University of Rhode Island, Kingston 02881, a symposium on physiological ecology of amphibians has been proposed for the AAAS meeting in Dallas, Texas, from 29-30 December 1968.

The symposium will have the general purpose of bringing together current work on physiological responses of amphibians to environmental changes. The amphibians, occupying the vertebrate evolutionary position of transition from aquatic to terrestrial existence, offer one of the most fruitful animal groups for study and eventual understanding of the evolution of physiological systems in diverse environments. A recent increase in interest in this field, as evidenced by the increasing number of investigators and publications suggests that this proposed symposium is both timely and appropriate.

First Session (29 December)

Chairman: Bernard S. Martof
- Francis L. Rose - Ecological Aspects of Glycogen and Lipid Utilization in Amphibians.
- Thomas B. Thorson - Partitioning of Body Water in Amphibians.
- James A. MacMahon - Water Relations in Amphibians.

Second Session (29 December)

Chairman: Walter G. Whitford
- Rodolfo Ruibal - Utilization of Soil Moisture by Amphibians.
- Vaughn H. Shoemaker - Physiological Effects of Dehydration.
- Bayard H. Brattstrom - Temperature Relations in Amphibians.

Third Session (30 December)

Chairman: Harold A. Dundee
- W. Frank Blair - Adaptation to Diverse Environments in Anurans.
- Victor H. Hutchison - Gas Exchange in Amphibians.
- Stanley Salthe - Molecular Aspects of Physiological Adaptation in Amphibians.

The above-listed papers should have a wide interest, especially to ecologists, comparative physiologists, and vertebrate zoologists. The symposium will be sponsored by the Ecological Society of America.

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A PLEA TO SAVE SHELTA CAVE IN ALABAMA

The National Speleological Society, acting through the timely agency of the Nature Conservancy, has recently moved to preserve access to one of the world's truly unique underground ecosystems. A remarkable assemblage of animals lives in the groundwaters beneath the bustling streets of Huntsville, Alabama, and Shelta Cave, whose adjacent entrances lie on a vacant lot just off the Pulaski Pike in this city, provides access to this unusual community. This lot recently came up for sale through an estate, and potential purchasers wanted to permanently seal the cave entrances to facilitate commercial development. In addition to cutting off access to this ecosystem for biologists, this action would have eliminated the colony of bats which inhabit the cave and probably drastically altered the ecological relationships to the detriment of the unique community. Thus, Shelta Cave became another in the unfortunately long list of examples of invaluable natural areas threatened by urbanization. Preservation of this cave is of utmost importance, and has been undertaken.

Shelta Cave's major claims to distinction lie in the remarkable diversity of its troglobitic (cave-adapted) animals and the fact that it is the type locality for nine species of cave animals, two of them apparent endemics. It will also be the type locality for other forms not yet described. It probably contains more kinds of major aquatic troglobites than any known cave in the world, and its terrestrial fauna is also quite rich. Thus, it offers for study an ecosystem in which the environmental parameters are reduced and yet where the maximum community complexity attainable in such a deprived environment may well be represented. In addition to its potential as a natural ecological "laboratory" and its value as a multiple type locality, the cave is also a marvelous nature preserve. It is one of but a few caves known to house three distinct species of troglobitic crayfishes, one of them an as-yet undescribed endemic, and is the type locality for one of the others. It also harbors a population of the endemic cave shrimp, Palaemonias alabamae, one of only two known troglobitic atyids. Other aquatic troglobites in Shelta include the fish Typhlichthys subterraneus, the salamander Gyrinophilus palleucus, an undescribed flatworm, and an undescribed amphipod. In addition to its aquatic fauna, Shelta contains at least nine species of terrestrial troglobites -- three cave beetles, a snail, a pseudoscorpion, a millipede, a spider, a dipluran, and an undescribed thysanuran. It is the type locality of six of these animals, as well as of the non-troglobitic isopod, Miktoniscus alabamensis. In all, counting non-troglobites but not microscopic forms or para sites, the cave houses populations of over forty species of animals.

In addition to research programs, educational tours involving the local community and various school groups are envisioned as part of the program for use of the cave. The Huntsville Chapter of the National Speleological Society will serve as custodian of the cave and administer it according to policies established by the Society's Research Advisory Committee and Nature Conservancy.

Further information on the Project may be obtained from John E. Cooper, Department of Zoology and Institute of Speleology, University of Kentucky, Lexington, Kentucky 40506.

The National Speleological Society needs the help of all biologists, conservationists and other concerned persons in its campaign to Save Shelta Cave. Its immediate goal is to raise $10,000. Tax-deductible contributions may be sent to:

"N. S. S. Shelta Cave Project", 2318 N. Kenmore Street, Arlington, Virginia 22201.



UNIVERSITY OF MICHIGAN AMPHIBIAN FACILITY

The University of Michigan's Amphibian Facility at Ann Arbor was developed by Dr. George W. Nace and is now organized as a joint project of the Department of Zoology and the Center for Human Growth and Development. The original impetus for developing the facility was Dr. Nace's need for amphibians of defined nutritional, health, and genetic background. These amphibians were used for molecular studies of embryonic and tumor development. A second objective is to produce these animals for others in the scientific community. This includes the development of practical procedures for maintaining large laboratory colonies of these animals. Colonies of both anuran and urodele species are under development, although to date the major emphasis has been on Rana pipiens.

Major support for the Amphibian Facility comes from a domestic NSF grant and from the Damon Runyon Memorial Foundation. Additional support comes from a U. S. -Japan Cooperative Science Program grant organized in cooperation with President T. Kawamura of the University of Hiroshima who also has an amphibian facility. His objectives are primarily concerned with ranid speciation and development.

"Inbred" strains of amphibians are produced by use of gynogenetic techniques. Currently the second generation of animals developed in the laboratory is approaching metamorphosis. These have been developed since the present space in the Argus Building in Ann Arbor was occupied in 1966.

BOOK REVIEW

The Life and Demography of the Side-Blotched Lizard, Uta stansburiana, Misc. Publ. Mus. Zool. Univ. Mich., No. 135, 182 p. by Donald W. Tinkle, Museum of Zoology, University of Michigan, Ann Arbor, Michigan, U. S. A. Available from the Museum of Zoology, Univ. Mich. at $3.75 paperbound or $4.75 cloth.

Most studies on reptilian populations are either of relatively short duration or cover only a few aspects and as such have limited comparative value. Dr. Tinkle's study lasted 9 years (6 years intensively) and in addition to detailed treatment of demography, growth, reproductive cycle and home range and territory, also included somewhat more general studies of feeding habits, predators, shedding, regeneration, courtship behavior, thermal ecology and temperature tolerances, radiation effects and homing ability. Few investigations in this field have achieved such a high degree of comprehensiveness and thoroughness. That is not to say that no gaps are present or that all aspects were covered as completely as might be desired. Indeed, the author has indicated in various places where more data are needed, where additional studies are desirable for a complete understanding of even this one species, and where his information admits of alternative interpretations. This in itself is a contribution in that it should stimulate further investigation.

One of the unique features of this study is the emphasis on comparative demography, and the example provided by a comparison of Texas and Colorado populations of Uta stansburiana. As the author points out, data adequate for making comparisons of the sort contributing to an understanding of either the evolution of demographic properties or how they are influenced by environmental factors are painfully few. In some cases useful data were obtained from only 10-20 published reports. The author's appeal that clutch size, growth, movements, and longevity should be studied on a population basis rather than by recourse to records on a few individuals, his suggestion that experimental approaches (in both field and laboratory) toward study of lizard populations, and his enumeration of specific problems arising from the study of Uta, should all pave the way toward more meaningful research in this area.

In addition to contributing original data this paper reviews the literature on many of the topics covered by his study. Though some aspects are more comprehensively reviewed than others, all are critically treated. Selection of papers with data of comparative value was made rather than attempting to discuss all publications in a particular field.

Harold Heatwole, Department of Zoology, University of New England, Armidale, N. S. W., Australia.

New Books & Reprints

The Systematic Position of the Poisonous Snake Ancistrodon rhodostoma (Boie) (Serpentes, Crotalidae) Based on its Cranial Osteology, by S. A. Chernov, Zoological Journal 36(5): 790-792 [translated from Russian by Mrs. L. Ewbank]. Available from: Smithsonian Herpetological Information Services, Division of Reptiles and Amphibians, U. S. National Museum, Washington, D. C. 20560.

On the Adaptation of Certain of our Snake Species for Eating Bird's Eggs, by S. A. Chernov, Zoological Journal 36(4): 260-264 [translated from Russian by Helen Viataitis]. Available from S. H. I. S. (address above).

Reptiles de Chile, by Roberto Donoso-Barros. 137 pls. (32 in color), distribution maps in text, cloth, 458 p. Santiago 1966. Available for $20.00 from Eric Lundberg, Ashton, Maryland 20702.

Geographical Voice Variability in Animals as an Ecological and Evolutionary Problem, by G. N. Simkin and V. D. Il'ichev, Zoological Journal 44(4): 483-493 [translator unknown]. Available from S. H. I. S. (address above).

The Travels of the Naturalist Charles-Alexandre Leseuer in North America, 1815-1837, by E. T. Hamy; translated by Milton Haber. 1968. 106 p., 29 illus. Available from Kent State University Press, Kent, Ohio 44240. [Leseuer's Travels, in addition to revealing his many scientific pursuits, will be of interest to those studying the history of science in America. Leseuer's herpetological descriptions include Graptemys geographica, Trionyx muticus which he discovered near New Harmony, Indiana, during his travels. — Ed.]

Amphibiens Urodeles de la Chine, by M. L. Y. Chang. 1936 (reprinted 1968). 165 p., 5 plates, with an introduction by Arden H. Brame, Jr.

*Individuals: $6.00 paperbound; $10.00 cloth.

*Institutions: $12.00 paperbound; $20.00 cloth.

Send orders to the Publications Secretary: Henri C. Seibert, Department of Zoology, Ohio University, Athens, Ohio 45701.

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DORIS MABLE COCHRAN

Doris M. Cochran, 70, died May 22 after a long illness. Born May 18, 1898 at North Girard, Pennsylvania, she began her 50-year career with the Smithsonian Institution as a museum aide in 1919. In 1920 she earned her A. B., and in 1921 her M. S., both at George Washington University. In 1927 she was appointed assistant curator of reptiles and amphibians at the U. S. National Museum. Following this appointment, Dr. Cochran received an M. A. from John Hopkins University in 1928, and was awarded her Ph. D. from the University of Maryland in 1933. In 1942 she was elevated to the rank of associate curator at the U. S. N. M., and from 1956 to 1966 she served as Curator-In-Charge of the U. S. National Museum's division of reptiles and amphibians.

Dr. Cochran's research work centered on South American frogs, though her interests ranged from the myology of the crustaceans to the taxonomy of the reptiles and amphibians of the West Indies, Siam, and the East Indies. Additionally, she was a talented weaver. In 1946 she served with the Atomic Energy Commission. She was honored in 1953 when the Herpetologist's League dedicated an issue of its publication to her, and in 1962 she was named Distinguished Fellow of the American Society of Ichthyologists and Herpetologists. Dr. Cochran published numerous articles, many of which she personally illustrated. Her most popular book, Living Amphibians of the World, has been translated into nine languages. — Ed.

MEMBERS DESIDERATA

Mary L. Anderson, 2236 Denniston Avenue, Roanoke, Virginia, wishes correspondence with others regarding cruelty to turtles sold in commercial establishments.

Sylvester E. Dietrich, Hidden Ridge Lab., Route 2, Box 142, New Haven, Missouri wishes addresses of foreign herpetological organizations. Also interested in books on anatomy and diseases of snakes.

Current Herpetological Titles, III: 1968

By H. G. Dowling, Itzchak Gilboa, and Irene Palser

GENERA OF REPTILES, American Museum of Natural History, New York, New York 10024.

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THIS THIRD LIST OF CURRENT HERPETOLOGICAL TITLES (SEE HERPETOLOGICAL REVIEW NUMBERS 2 AND 3 FOR PREVIOUS LISTS) INCLUDES ALL TITLES PUBLISHED IN 1968 THAT HAVE COME TO OUR ATTENTION DURING THE PERIOD 16 MAY TO 5 AUGUST. A FEW TITLES HAVE BEEN OBTAINED FROM SECONDARY SOURCES, BUT THESE MAKE UP LESS THAN 5 PER CENT OF THE TITLES LISTED. LIKE THE PREVIOUS LISTS, THIS ONE IS PHOTO-OFFSET REPRODUCTION FROM COMPUTER PRINTOUT.

FUTURE: TO THIS DATE THE CURRENT LIST OF TITLES HAS BEEN NO MORE THAN THAT. HOWEVER, WE HAVE BEGUN TO CROSS-INDEX THE 1968 LITERATURE FOR ACCESS THROUGH TAXONOMIC, GEOGRAPHIC, AND SUBJECT AVENUES. WE DO NOT ANTICIPATE PUBLISHING THIS INDEX BUT INSTEAD ARE ATTEMPTING TO COORDINATE OUR EFFORTS WITH BIOLOGICAL ABSTRACTS AND ZOOLOGICAL RECORD.

ONE POINT THAT HAS NOT BEEN EMPHASIZED TO DATE IS THAT THE VAST MAJORITY OF LISTED PAPERS IS IMMEDIATELY AVAILABLE TO US. WE ARE BASED AT ONE OF THE GREATEST (AND LIKELY THE MOST ACCESSIBLE) HERPETOLOGICAL LIBRARIES OF THE WORLD. WE DO NOT ANTICIPATE BEING READY TO ACT AS A BIBLIOGRAPHIC SERVICE FOR ANOTHER YEAR. HOWEVER, IF YOU ARE REALLY STUCK FOR A REFERENCE, LET US KNOW: WE WILL SEE WHAT WE CAN DO.

ACKNOWLEDGMENTS: THIS LIST WAS PREPARED WITH THE AID OF THE HERPETOLOGY DEPARTMENT AND THE LIBRARY OF THE MUSEUM, AND THE DEPARTMENT OF ZOOLOGY AND THE COMPUTER LABORATORY OF THE UNIVERSITY OF RHODE ISLAND. WE ARE ESPECIALLY GRATEFUL FOR THE HELP OF MR. JAMES BRADLEY OF THE COMPUTER LABORATORY. THE PROJECT IS SUPPORTED BY THE NATIONAL SCIENCE FOUNDATION (NSF GN-707).

ON USING THE LIST: THE LIST IS ARRANGED, AS IS CUSTOMARY, ALPHABETICALLY BY SENIOR AUTHOR, FOLLOWED BY THE DATE, TITLE, AND JOURNAL REFERENCE. IN ADDITION, THE NAMES OF JUNIOR AUTHORS ARE REFERRED TO THE PROPER CITATIONS BY "SEE" LINES THAT ARE IN THE FORM OF A CODE. NOTE, FOR EXAMPLE, THE REFERENCE UNDER "AB'SABER,AZIZ N." THAT SAYS, (SEE VANPE-968DRS: 205). THE "VANPE" REFERS TO A PAPER BY VANZOLINI,P.E. AND AB'SABER (THE CODE IS DERIVED FROM THE FIRST THREE LETTERS OF THE SENIOR AUTHOR'S FAMILY NAME AND THE INITIAL LETTERS OF HIS (FIRST TWO) GIVEN NAMES). THE "968" IS THE YEAR OF PUBLICATION, MINUS THE INITIAL "1", AND THE FOLLOWING "DRS" IS DERIVED FROM THE INITIAL LETTERS OF THE FIRST THREE SIGNIFICANT WORDS OF THE TITLE (OR SUBTITLE IF THE PAPER IS ONE OF A SERIES). THE NUMBER "205" AFTER THE COLON IS THE INITIAL PAGE NUMBER OF THE ARTICLE. THUS, THOUGH THE CODE DOES NOT FOLLOW STRICT ALPHABETICAL ORDER, IT IS VERY SPECIFIC.

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AB'SABER,AZIZ N. (SEE VANPE-968DRS: 205)

ACEVES,JORGE, DAVID ERLIJ AND CHARLES EDWARDS
1968 NA+ TRANSPORT ACROSS THE ISOLATED SKIN OF AMBYSTOMA MEXICANUS
BIOCHIM BIOPHYS ACTA 150(4):744-746.

ADAMS,DONALD R.
1968 STOMACH CONTENTS OF THE SALAMANDER BATRACHOSEPS ATTENUATUS IN CALIFORNIA
HERPETOLOGICA 24(2):170-172, 1 TAB.

ADLER,KRAIG
1968 SYNONYMY OF THE PLIOCENE TURTLES PSEUDEMYS HILLI COPE AND CHRYSEMYS LIMNODYTES GALBREATH
J HERPETOL 1(1-4):32-38, 3 FIG.

AIMAR,CHRISTIAN (SEE LERM -968GNI:1042)
AITKEN,T.H.G. (SEE WORCB-968VP : 269)
ALBRIGHT,JOHN (SEE PATD -968FSR: 406)

AMARO,A. AND S.SENA
1968 "NYCTOTHEROIDES SPIROSTOMATUS" SP. N. (CILIATEA, HETEROTRICHIDA), ENTEROZOARIO DE "BUFO CRUCIFER" WIED, DO ESTADO DA BAHIA, BRASIL
ATAS SOC BIOL RIO DE JANEIRO 11(5):175-176, 1 FIG.

AMIRANTE,G.A.
1968 INDUCTION OF ANTIBODIES AGAINST PURE PROTEINS IN XENOPUS LAEVIS DAUD.
EXPERIENTIA 24(2):171-172, 4 FIG.

ANASTASI,A., V.ERSPAMER AND R.ENDEAN
1968 ISOLATION AND AMINO ACID SEQUENCE OF CAERULEIN, THE ACTIVE DECAPEPTIDE OF THE SKIN OF HYLA CAERULEA
ARCH BIOCHEM BIOPHYS 125(1):57-68, 3 FIG., 1 TAB.

ANDERSON,DAVID R., DONALD W.DUSZYNSKI AND WILLIAM C.MARQUARDT
1968 THREE NEW COCCIDIA (PROTOZOA: TELOSPOREA) FROM KINGSNAKES, LAMPROPELTIS SPP., IN ILLINOIS, WITH A REDESCRIPTION OF EIMERIA ZAMENIS PHISALIX, 1921
J PARASIT 54(3):577-581, 13 FIG.

ANDERSON,OSCAR (SEE GRAD -968HOO:1354)

ANDRES,G., H.GAUCH AND H.STEINICKE
1968 INTERAKTIONEN MIGRATORISCHER ZELLSYSTEME IN DER AMPHIBIENENTWICKLUNG
ZOOL ANZ 31(SUP):71-80, 7 FIG.

ANDRUSHKO,A.M. AND E.N.KRASILNIKOV
1968 ON CONTAMINATION OF CENTRAL ASIATIC REPTILES BY BLOODSUCKING PARASITES
UZBEK BIOL ZH 1968:54-56. (RUSS, ENG SUMM)

ANIOLA,STEFAN AND STANISLAW KUZNIAK
1968 ZOLW BLOTNY W WIELKOPOLSCE
CHRONMY PRZYR OJCZYSTA N.S. 24(1):36-42, 3 FIG. (ENG SUMM)

ANON
1968 FARMING OF CROCODILES NEW PROJECT IN UGANDA
AFR WILDL NEWS 3(1):9.

ANON
1968 L. M. KLAUBER
HERPETOL REV (3):7.

ANON
1968 NEW RESERVE PROTECTS GREEN TURTLE
ORYX 9(4):249.

ANON
1968 QUICK ACTION TO SAVE THE SNAKE BITE VICTIM
PATIENT CARE 2(6):55, 57, 61-63, 67, ILL.

ANON
1968 LES REPTILES SONT A L'ETROIT DANS LEUR COSTUME ETRIQUE
BETES NAT 1968(52):10-11, ILL.

ANON
1968 SNAKEBITE BENEFITS
GEOGR MAG 1968(6):1245.

ANON
1968 SELECTIVE SUPPRESSION OF ANTIBODY REACTION NEARSUSING SNAKE VENOM
SCI RES 3(9):20.

ANTONI,H. AND M.ROTMANN
1968 THE NEGATIVE INOTROPIC MECHANISM OF ACETYLCHOLINE IN THE ISOLATED FROG'S MYOCARDIUM
PFLUGERS ARCH GESAMTE PHYSIOL MENS TIERE 300(2): 67-86, 10 FIG., 2 TAB. GERMAN (ENG SUMM)

APLINGTON,H.W.,JR. AND BRANT W.TEDROW
1968 DISTRIBUTION OF THYROTROPHIC ACTIVITY IN THE HYPOPHYSIS OF NECTURUS BEFORE AND AFTER THYROIDECTOMY AS MEASURED BY I 131 BIOASSAY IN MICE
ANAT REC 160(2):273-277, 3 FIG., 1 TAB.

APONTE,AULOGELIO (SEE CODEL-968CAR: 150)

APRISON,M.H., R.P.SHANK, R.A.DAVIDOFF AND R.WERMAN
1968 THE DISTRIBUTION OF GLYCINE, A NEUROTRANSMITTER SUSPECT IN THE CENTRAL NERVOUS SYSTEM OF SEVERAL VERTEBRATE SPECIES
LIFE SCI 7(11):583-590, 1 FIG.

ARCHER,W.H.
1968 THE PADLOPERS
AFR WILD LIFE 22(1):29-35, 6 FIG.

ARORA,G.S. (SEE PANBP-968MBP: 79)

AROS,B. (SEE TEII -968GMP: 163)

ASH,LAWRENCE R.
1968 THE OCCURRENCE OF ANGIOSTRONGYLUS CANTONENSIS IN FROGS OF NEW CALEDONIA WITH OBSERVATIONS ON PARATENIC HOSTS OF METASTRONGYLES
J PARASIT 54(3):432-436.

ASHLEY,B.D. AND P.M.BURCHFIELD
1968 MAINTENANCE OF A SNAKE COLONY FOR THE PURPOSE OF VENOM EXTRACTION
TOXICON 5(4):267-275, 5 FIG.

ATKIN,ADAM (SEE TAUES-968ORM:1365)

ATKINS,LEONARD (SEE GORGC-968IIC: 1)

AUDRETSCH,F.C.DE
1968 AANTEKENINGEN OVER AMFIBIEEEN EN REPTIELEN IN SURINAME DEEL IX
LACERTA 26(6):51-52, 2 FIG.

AUERBACH,ROBERT (SEE SIDYA-968TCA: 187)

AUSIELLO,DENNIS A. AND GEOFFREY W.G.SHARP
1968 LOCALIZATION OF PHYSIOLOGICAL RECEPTOR SITES FOR ALDOSTERONE IN THE BLADDER OF THE TOAD, BUFO MARINUS
ENDOCRINOLOGY 82(6):1163-1169, 1 FIG., 3 TAB.

AVE,KIICHIRO, IZUMI KAWAKAMI AND MUNEFUMI SAMESHIMA
1968 STUDIES ON THE HETEROGENEITY OF CELL POPULATIONS IN AMPHIBIAN PRESUMPTIVE EPIDERMIS, WITH REFERENCE TO PRIMARY INDUCTION
DEVELOP BIOL 17(6):617-626, 3 FIG.

AWBREY,FRANK T.
1968 CALL DISCRIMINATION IN FEMALE SCAPHIOPUS COUCHII AND SCAPHIOPUS HURTERII
COPEIA 1968(2):420-423.

AXTELL,RALPH W.
1968 HOLBROOKIA LACERATA
CAT AMER AMPHIBIANS REPTILES :56, 1 MAP.

----B----

BADIR,NASRI
1968 THE EFFECT OF POPULATION DENSITY ON THE EMBRYONIC MORTALITY IN THE VIVIPAROUS LIZARD CHALCIDES OCELLATUS (FORSK.)
ANAT ANZ 122(1):11-14.

BADIR,NASRI
1968 STRUCTURE AND FUNCTION OF CORPUS LUTEUM DURING GESTATION IN THE VIVIPAROUS LIZARD CHALCIDES OCELLATUS
ANAT ANZ 122(1):1-10, 2 FIG.

BAGCHI,M., H.ROTHSTEIN AND G.S.STEIN
1968 SYNTHESIS OF MACROMOLECULES IN EPITHELIAL CELLS OF THE CULTURED AMPHIBIAN LENS. II. EFFECTS OF PUROMYCIN AND ACTINOMYCIN D ON PROTEIN SYNTHESIS
EXP CELL RES 50(2):454-459, 5 FIG.

BAKER,NELSON W.
1968 MILLIPEDES, AND CENTIPEDES
MUSEUM TALK 1968(1):1-8.

BALDRIDGE,ROBERT (SEE WATF -968ALD: 447)

BALDWIN,JOHN AND CHEV KIDSON
1968 RECOGNITION OF DNA BASE SEQUENCE DIFFERENCES AMONG VERTEBRATES
NATURE 217(5135):1256-1257, 2 FIG., 2 TAB.

BALTUS,E. (SEE HANJ -968SDX: 273)

BANI,G.
1968 CELLULE PARTICOLARI, PROBABILI RECETTORI, NELL'EPIDERMIDE DI TRITURUS CRISTATUS CARNIFEX
BOLL SOC ITAL BIOL SPER 44(4):244-246.

BANKS,BARBARA E.C., D.V.BANTHORPE, A.R.BERRY, H.FF.S.DAVIES, S.DOONAN, D.MARGARET LAMONT, R.SHIPOLINI AND C.A.VERNON
1968 THE PREPARATION OF NERVE GROWTH FACTORS FROM SNAKE VENOMS
BIOCHEM J 108(1):157-158.

BANTA,BENJAMIN H.
1968 THE RECENT HERPETOFAUNA OF THE NORTHERN WET MOUNTAINS, SOUTH-CENTRAL COLORADO
J HERPETOL 1(1-4):120. (ABSTR)

BANTHORPE,D.V. (SEE BANBE-968PNG: 157)

BARBOUR,ROGER W.
1968 THE RING-NECKED SNAKE
KENTUCKY HAPPY HUNTING GROUND 24(4):33.

BARBOUR,ROGER W.
1968 THE WORM SNAKE
KENTUCKY HAPPY HUNTING GROUND 24(3):37, ILL. (COL)

BARGHUSEN,HERBERT R.
1968 THE LOWER JAW OF CYNODONTS (REPTILIA, THERAPSIDA) AND THE EVOLUTIONARY ORIGIN OF MAMMAL-LIKE ADDUCTOR JAW MUSCULATURE
POSTILLA (116):1-49, 13 FIG., 6 PL.

BARRETT,R. (SEE BULTH-968RHR: 1)
BARRETT,ROBERT (SEE BULTH-968RHR: 19)

BARRIO,AVELINO
1968 REVISION OF THE GENUS LEPIDOBATRACHUS BUDGETT (ANURA, CERATOPHRYNIDAE)
PHYSIS 27(75):445-454, 5 FIG. (ENG SUMM)

BARRIO,AVELINO
1968 (REVIEW OF) REPTILES DE CHILE BY R. DONOSO BARROS
PHYSIS 27(75):460.

BARUS,V. (SEE SONMD-968FNB: 55)

BARUS,V. AND A.COY OTERO
1968 FREITASIA TEIXEIRAI GEN. N. ET SP. N. AND OTHER NEMATODES PARASITIZING ANOLIS EQUESTRIS (SQUAMATA: IGUANIDAE)
FOLIA PARASITOL (PRAHA) 15(1):41-54, 5 FIG., 1 TAB.

BASHIRELAHI,NASSER (SEE ZADJA-968IRS: 290)
BASS,A.J. (SEE HUGGR-968NAR: 423)
BAUCOM,J.N. (SEE JASAM-968PAA: 93)
BAUMGARTEN,HANS GEORG (SEE WARH -968EUF: 99)

BEAUGE,L.A. AND R.A.SJODIN
1968 TRANSPORT OF CAESIUM IN FROG MUSCLE
J PHYSIOL (CAMBRIDGE) 194(1):105-123, 8 FIG., 6 TAB.

BECHTLE,W.
1968 DAS DRITTE AUGE DES GRASFROSCHS
KOSMOS 64(5):215, ILL.

BECHTLE,WOLFGANG
1968 DIE GROESSTEN KROETEN DER WELT, BUFO BLOMBERGI WIEGT EINEN WEIHNACHTSKARPFEN AUF
AQUAR MAG 1968(5):200-202, ILL.

BECK,J.WALTER AND MARY BEVERLEY-BURTON
1968 THE PATHOLOGY OF TRICHURIS, CAPILLARIA AND TRICHINELLA INFECTIONS
HELMINTHOL ABST 37(1):1-26.

BECKERT,WILLIAM H. AND WALTER DOYLE
1968 BUFO REGULARIS, A TWENTY-CHROMOSOME TOAD
GENET RES 11(2):209-210, 1 PL.

BELEKHOVA,M.G.
1968 POSTTETANIC POTENTIATION AND RECRUITMENT IN CEREBRAL CORTEX OF THE TURTLE
NEUROSCI TRANSL 1967-68(2):204-212, 5 FIG., (FROM ZHURNAL VYSSHEI NERVNOI DEYATEL'NOSTI IMENI I. P. PAVLOVA, VOL. 17, NO. 3, P. 513, 1967)

BELLAIRS,A.D'A.
1968 (REVIEW OF) LIVING TURTLES OF THE WORLD BY P.C.H.PRITCHARD, 1967
BRIT J HERP 4(2):44.

BELLAMY,DENIS
1968 EVOLUTION UP THE AMAZON
NEW SCIENTIST 37(587):532-535, ILL.

BELLIS,EDWARD D.
1968 SUMMER MOVEMENT OF RED-SPOTTED NEWTS IN A SMALL POND
J HERPETOL 1(1-4):86-91, 3 FIG., 1 TAB.

BELTON,JOHN C. AND ALFRED OWCZARZAK
1968 CELLULAR CHANGES ASSOCIATED WITH THE PRE-OVULATORY DEPOSITION AND STORAGE OF HEPATIC LIPIDS IN THE FROG ASCAPHUS TRUEI
HERPETOLOGICA 24(2):113-127, 7 FIG.

BENAZZI,MARIO AND GIUSEPPINA BENAZZI LENTATI
1968 GYNOGENESIS AND POLYPLOIDY IN THE ANIMAL KINGDOM
RIV BIOL 60(3-4):625-631. (ITALIAN TEXT 617-624)

BENTLEY,P.J.
1968 AMILORIDE: A POTENT INHIBITOR OF SODIUM TRANSPORT ACROSS THE TOAD BLADDER
J PHYSIOL 195(2):317-330.

BERANEK,R. AND F.VYSKOCIL
1968 THE EFFECT OF ATROPINE ON THE FROG SARTORIUS NEUROMUSCULAR JUNCTION
J PHYSIOL 195(2):493-

BERGERHOFF,K. AND W.HANKE
1968 DIE REGULATION DES KOHLENHYDRATSTOFFWECHSELS DURCH NEBENNIERENRINDEN-HORMONE BEI ANUREN UND FISCHEN
ZOOL ANZ 31(SUP):530-541, 7 FIG.

BERGERHOFF,K. (SEE PEHFW-968FVF: 216)
BERMAN,HERBERT J. (SEE MCKEL-968FSU: 483)
BERNDT,W.O. (SEE GATJT-968IEC: 770)
BERRY,A.R. (SEE BANBE-968PNG: 157)
BESSLER,H. (SEE DJAM -968FSH: 295)
BEVERLEY-BURTON,MARY (SEE BECJW-968PTC: 1)

BIBER,THOMAS U.L. AND PETER F.CURRAN
1968 COUPLED SOLUTE FLUXES IN TOAD SKIN
J GEN PHYSIOL 51(5):606-620, 5 FIG., 3 TAB.

BIRC,G.
1968 FREQUENT ACTION POTENTIALS OF FROG'S NERVE AND MUSCLE
ACTA BIOCHIM BIOPHYS 3(1):107-114.

BIRT,GORDON R.
1968 IT WAS A CROCODILE
WALKABOUT 34(3):5.

BISWAS,S.
1968 NOTES ON THE AGAMID LIZARD PTYCTOLAEMUS GULARIS (PETERS) FROM KHASI HILLS, ASSAM
J BOMBAY NAT HIST SOC 64(3):561-563, 1 FIG.

BITTAR,E.E., D.A.T.DICK AND D.J.FRY
1968 ACTION OF INSULIN ON SODIUM EFFLUX FROM THE TOAD OOCYTE
NATURE 217(3135):1280-1281, 3 FIG.

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TEXAS J SCI 20(1):77-86, 5 FIG., 1 TAB.

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1968 CONSEQUENCES CYTOLOGIQUES DES LESIONS CORTICALES CHEZ L'OEUF DE XENOPUS LAEVIS
COMP REND ACAD SCI (PARIS) D 266(10):1039-1041, 6 FIG.

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J MAMMALOGY 49(1):14-21, 2 FIG., 3 TAB.

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BRANSTON,N.M. AND D.G.FLEMING
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EXP NEUROL 20(4):611-623, 8 FIG.

BRATTSTROM,BAYARD H.
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COMP BIOCHEM PHYSIOL 24:93-111, 10 FIG.

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1968 NOTES UPON SOME TURTLES FROM SURINAM
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BUENO,ENRIQUE J. AND LELIO CORCHS
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J GEN PHYSIOL 51(6):785-801, 8 FIG., 2 TAB.

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1968 RADIANT HEAT RECEPTION IN SNAKES
COMMUN BEHAV BIOL B 1(1):1. (ABSTR)

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1968 RADIANT HEAT RECEPTION IN SNAKES
COMMUN BEHAV BIOL A 1(1):19-29, 4 FIG.

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BRIT J HERP 4(2):22-24, 1 FIG.

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1968 THE EFFECT OF STIMULUS AREA ON THE RESPONSE OF MOVEMENT DETECTING NEURONS IN THE FROG'S RETINA
PFLUGERS ARCH GESAMTE PHYSIOL MENS TIERE 298(4): 283-293, 4 FIG.

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ANAT REC 160(2):461-462. (ABSTR)

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VISION RES 8(6):697-700, 3 FIG.

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AQUA TERRA 5(5):34-36, 3 FIG.

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TEXAS J SCI 19(4):445. (ABSTR)

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HERPETOLOGICA 24(2):141-146, 3 FIG.

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1968 TELMATOBIINAE FROM THE BASALTIC LAKES OF NEUQUEN PROVINCE (ANURA, LEPTODACTYLIDAE)
PHYSIS 27(75):265-284, 6 FIG., 1 TAB. (ENG ABSTR)

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1968 FLUXES AND DISTRIBUTION OF SODIUM IN FROG SKIN, A NEW MODEL
J GEN PHYSIOL 51(5):280-289, 2 FIG., 1 TAB.

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1968 THE EFFECT OF SODIUM CONCENTRATION ON THE CONTENT AND DISTRIBUTION OF SODIUM IN THE FROG SKIN
J PHYSIOL (CAMBRIDGE) 196(1):237-253, 2 FIG., 4 TAB.

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J HERPETOL 1(1-4):121. (ABSTR)

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CHAVIN,W. (SEE CHEYM-968MFS: 332)

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COMP REND ACAD SCI (PARIS) D 266(8):798-801, 11 FIG., 2 TAB.

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CHLAPOWSKI,F.J. (SEE TASRA-968LRA: 157)

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ANAT REC 160(2):463. (ABSTR)

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CIVAN,MORTIMER M. AND HOWARD S.FRAZIER
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J GEN PHYSIOL 51(5):589-605, 7 FIG., 1 TAB.

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CYTOGENETICS 7(1):16-26, 4 FIG., 4 TAB.

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AMER J TROP MED HYG 17(2):308-310, 1 FIG., 1 TAB.

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J HERPETOL 1(1-4):71-75, 2 FIG., 2 TAB.

COLVILLE,JEAN
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ANAT REC 160(2):333-334. (ABSTR)

CONNELLY,THOMAS G.
1968 INFLUENCE OF PROLACTIN ON LIMB REGENERATION IN ADULT NEWTS
ANAT REC 160(2):334. (ABSTR)

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1968 CHRONIC ALLOGRAFT REJECTION IN THE IGUANA CTENOSAURA PECTINATA
PROC SOC EXP BIOL MED 128(1):150-154, 5 FIG., 1 TAB.

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COPEIA 1968(2):224-229, 2 FIG., 1 TAB.

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CRIPPA,MARCO (SEE DAVEH-968EAN: 152)
CUELLAR,HECTOR S. (SEE NELCE-968ACT: 423)

CUELLAR,ORLANDO
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CYPERMAN,A. (SEE GOTSF-968EXK: 449)

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DARTNALL,H.J.A.
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VISION RES 8:339-358, 4 FIG., 6 TAB.

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AQUAR TERR 15(2):48-49, 2 FIG.

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1968 EVIDENCE FOR THE APPEARANCE OF NOVEL GENE PRODUCTS DURING AMPHIBIAN BLASTULATION
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DAWSON,JOHN H. (SEE COHP -968CMF: 308)

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ANAT REC 160(2):338. (ABSTR)

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ANAT REC 160(2):338. (ABSTR)

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EXPERIENTIA 24(4):383-386, 7 FIG.

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ZEITSCHR ZELLFORSCH MIKR ANAT 87(1):1-16, 35 FIG.

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ANN BIOL SER 4, 7(3-4):189-225, 6 FIG.

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DOLCINI,BIANCAMARIA (SEE DOLC -968RFI: 91)

DOLCINI,CARLO AND BIANCAMARIA DOLCINI
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DOONAN,S. (SEE BANBE-968PNG: 157)
DOORENMAALEN,W.J.VAN (SEE BRASK-968SLR: 519)

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DOYLE,WALTER (SEE BECWH-968BRT: 209)

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AQUAR TERR Z 21(6):183-185, ILL.

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UNIV KANSAS PUBL MUS NAT HIST 17(12):517-557, 9 FIG., 3 PL.

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1968 SMILISCA
CAT AMER AMPHIBIANS REPTILES :58, 1 MAP.

DUELLMAN,WILLIAM E.
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CAT AMER AMPHIBIANS REPTILES :59, 1 FIG., 1 MAP.

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CAT AMER AMPHIBIANS REPTILES :61, 1 FIG., 1 MAP.

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CAT AMER AMPHIBIANS REPTILES :62, 1 FIG., 1 MAP.

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CAT AMER AMPHIBIANS REPTILES :63, 1 FIG., 1 MAP.

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1968 ZUR NORMALENTWICKLUNG VON MERTENSIELLA CAUCASICA (AMPHIBIA, SALAMANDRIDAE)
SALAMANDRA 4(1):4-9, 3 FIG. (ENG SUMM)

HENSLEY,MAX
1968 ANOTHER ALBINO LIZARD, SCELOPORUS UNDULATUS HYACINTHINUS (GREEN)
J HERPETOL 1(1-4):92-93, 1 FIG.

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1968 BIOELECTRIC PROPERTIES AND IONIC CONTENT IN TOAD BLADDER
J GEN PHYSIOL 51(5):261-270, 8 FIG., 2 TAB.

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J GEN PHYSIOL 51(5):240-249, 2 FIG., 3 TAB.

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J PARASITOL 54(2):310-318, 9 FIG.

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J CLIN ENDOCRINOL METABOL 28(4):492-502, 3 FIG.

HOOD,L., W.R.GRAY, B.G.SANDERS AND W.J.DREYER
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1968 THE ROLE OF THE ELECTROCHEMICAL GRADIENT IN DETERMINING POTASSIUM FLUXES IN FROG STRIATED MUSCLE
J GEN PHYSIOL 51(5):193-203, 7 FIG.

HOROWITZ,SAMUEL B. AND I.ROBERT FENICHEL
1968 ANALYSIS OF GLYCEROL-3H TRANSPORT IN THE FROG OOCYTE BY EXTRACTIVE AND RADIOAUTOGRAPHIC TECHNIQUES
J GEN PHYSIOL 51(6):703-730, 13 FIG.

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J HERPETOL 1(1-4):94-95.

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J HERPETOL 1(1-4):117. (ABSTR)

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ANAT REC 160(2):475. (ABSTR)

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PHYSIOL ZOOL 41(1):65-85, 18 FIG., 5 TAB.
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BULL BRIT MUS (NAT HIST): ZOOL 16(4):161-183, 33 FIG.
INGRAM,VERNON M. (SEE MOSB -968CSH: 481)
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JACOBSON,C.M.
1968 THE DEVELOPMENT OF THE CHONDROCRANIUM IN TWO SPECIES OF THE AUSTRALIAN ANURAN GENUS PSEUDOPHRYNE FITZINGER
AUSTR J ZOOL 16(1):1-15, 24 FIG.

JACKSON,D.C.
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PFLUGERS ARCH GESAMT PHYSIOL MENS TIERE 300(1):1-22, 6 FIG., 6 TAB. (ENG SUMM)

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J PHYSIOL (PARIS) 60:51-66, 7 FIG., 1 TAB. (ENG SUMM)

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1968 PULMONARY ASPERGILLOSIS OF THE AMERICAN ALLIGATOR (ALLIGATOR MISSISSIPPIENSIS)
AMER J VET CLIN PATH 2:93-95, 2 FIG.

JENKINSON,D.H., B.A.STAMENOVIC AND BEATRICE D.L.WHITAKER
1968 THE EFFECT OF NORADRENALINE ON THE END-PLATE POTENTIAL IN TWITCH FIBRES OF THE FROG
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AMER ZOOL 8(2):191-210, 15 FIG.

JOHN,WOLFGANG
1968 ZWEI AUSTRALIER: AMPHIBOLURUS BARBATUS UND EGERNIA CUNNINGHAMI
AQUAR TERR Z 21(6):185-186, 1 FIG.

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1968 VARIATIONS OF CROTALUS SCUTULATUS RAW VENOM CONCENTRATIONS
J ARIZ ACAD SCI 5(1):41-42, 1 FIG., 1 TAB.

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JONES,CLYDE J. (SEE LOWCH-968NPS: 1)

JOSEPH,BARRY S. AND DAVID G.WHITLOCK
1968 CENTRAL PROJECTIONS OF BRACHIAL AND LUMBAR DORSAL ROOTS IN REPTILES
J COMP NEUROL 132(3):469-484, 9 FIG.

JOSEPH,BARRY S. AND DAVID G.WHITLOCK
1968 CENTRAL PROJECTIONS OF SELECTED SPINAL DORSAL ROOTS IN ANURAN AMPHIBIANS
ANAT REC 160(2):279-288, 6 FIG.

JOSEPH,BARRY S. AND DAVID G.WHITLOCK
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ANAT REC 160(2):372. (ABSTR)

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1968 LOCALIZATION OF SPIKE-PRODUCING CELLS IN THE FROG RETINA
VISION RES 8(3):259-262, 2 FIG.

KANKONKAR,R.C. (SEE DIMGD-968CSY: 283)

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1968 ELECTRON-MICROSCOPIC INVESTIGATION OF THE THYMUS OF ADULT FROG (RANA ESCULENTA)
ACTA BIOL ACAD SCI HUNG 19(2):203-213, 10 FIG.

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ANAT REC 160(2):374. (ABSTR)

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1968 PREMATING BEHAVIOR IN THE FENCE LIZARD, SCELOPORUS UNDULATUS
J HERPETOL 1(1-4):118. (ABSTR)

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1968 EFFECT OF INTERRUPTING RETINO-HYPOTHALAMIC CONNECTIONS ON THE MELANOPHORE RESPONSE IN XENOPUS LAEVIS
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CYTOGENETICS 7(1):78-90, 5 FIG., 2 TAB.

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AMER ZOOL 8(2):243-255, 15 FIG., 2 TAB.

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EXPLORER 10(2):10-13, ILL.

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COPEIA 1968(2):244-246, 1 FIG., 1 TAB.

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1968 BEEINFLUSSUNG DES EINGEWEIDESITUS BEIM ALPENMOLCH (TRITURUS ALPESTRIS) DURCH ELEKTRISCHEN STROM
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1968 LARVENGESTALT UND EINGEWEIDE-SITUS BEIM ALPENMOLCH (TRITURUS ALPESTRIS) NACH HALBSEITIGER UV-BESTRAHLUNG VON NEURULA- UND NACHNEURULA-KEIMEN
WILHELM ROUX ARCH ENTWICKL MECH ORG 160(3): 259-297, 10 FIG., 5 TAB.

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BULL GEORGIA ACAD SCI 26(2):57. (ABSTR)

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1968 CHIRONOMIDAE (DIPTERA) FROM THE HULA NATURE PRESERVE, ISRAEL
ANN ZOOL FENNICI 5(1):76-83, 8 FIG., 1 TAB.

KUNTZE,A. AND H.-G.PETZOLD
1968 DIE SCHLANGE IST NICHT FUER DEN SPIRITUS, MODERNE BEHANDLUNGSMETHODEN DER "MUNDFAEULE" (STOMATITIS ULCEROSA) BEI REPTILIEN
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1968 TOXIC SKIN SECRETIONS OF THE SPADE-FOOT TOAD PELOBATES FUSCUS
TOXICON 5(4):247-251, 4 FIG.

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1968 THE EFFECT OF ADRENALINE ON THE CALCIUM FLUXES IN FROG'S VENTRICLE
J PHYSIOL (CAMBRIDGE) 196(1):49P-50P.

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BRIT J HERP 4(2):28-32, 1 FIG.

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LANDRETH,HOBART F. AND DENZEL E.FERGUSON
1968 THE SUN COMPASS OF FOWLER'S TOAD, BUFO WOODHOUSEI FOWLERI
BEHAVIOUR 30(1):27-43, 5 FIG.

LANDRETH,HOBART F. (SEE FERDE-968SOB: 230)

LANGE,RAINER
1968 UEBER DIE VARIABILITAET UND EXPERIMENTELLE BEEINFLUSSUNG DER MORPHOLOGIE DER ZELLTYPEN IM INSELAPPARAT DES FROSCHES RANA RIDIBUNDA
Z ZELLFORSCH 88(3):353-364, 6 FIG.

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1968 ACCUMULATION ET TRANSFERT D'ACIDES AMINES PAR L'INTESTIN ISOLE DE RANA PIPIENS
ARCH INT PHYSIOL BIOCHIM 76(1):49-63, 2 TAB.

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1968 UEBER FIXATIONSBEDINGTE UNTERSCHIEDE IN DER ELEKTRONENMIKROSKOPISCHEN MORPHOLOGIE DER ZELLTYPEN IM INSELAPPARAT DES FROSCHES RANA RIDIBUNDA
Z ZELLFORSCH MICROSCOP ANAT 86(2):238-251, 10 FIG.

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LEHMANN,ROLF
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J PHYSIOL (CAMBRIDGE) 194(1):51-74, 14 FIG.

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TEXAS J SCI 19(4):349-352, 1 FIG.

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MCKEEVER,STURGIS (SEE KRIWA-968PSB: 57)
MCKEOWN,JAMES P. (SEE FERDE-968SOB: 230)

MCKINNON,ELIZABETH L., HERBERT J.BERMAN AND GEORGE R.SIGGINS
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AQUA TERRA 5(4):28-32, 7 FIG.

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ORGAN,JAMES A. AND DELLA J.ORGAN
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2 FIG., 1 TAB., 2 PL.

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SALAMANDRA 4(1):1-3, 1 FIG. (ENG SUMM)

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TRANS WIS ACAD SCI 56:29-48, 1 FIG.

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J HERPETOL 1(1-4):39-63, 2 FIG.

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J GEN PHYSIOL 51(5):271-279, 12 FIG.

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J MORPH PHILAD 124(3):321-343, 2 FIG., 5 PL.

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ARCH INT PHYSIOL BIOCHEM 76(2):209-213, 5 FIG.

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1968 ZUR KENNTNIS VON TESTUDO HERMANNI IM TYRRHENISCHEN GEBIET
AQUA TERRA 5(6):41-47, 9 FIG.

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ZH OBSHCHEI BIOL 29(2):177-185, 3 FIG., 2 TAB.
(RUSS, ENG SUMM)

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SUBTELNY,S. (SEE SMILD-968VIP: 627)
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J EXP ZOOL 167(2):157-164, 3 FIG., 3 TAB.

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ZOOL ANZ 31(SUP):380-385, 2 FIG.

THOMAS,RICHARD (SEE GORGC-968IIC: 1)
THOMPSON,FRED G. (SEE KINW -968RAL: 93)
THORNTON,CHARLES S. (SEE SPRTH-968ILR: 499)
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J HERPETOL 1(1-4):118-119. (ABSTR)

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COPEIA 1968(2):299-303, 1 FIG.

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TOERO,I. (SEE KAPE -968EIT: 203)
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COPEIA 1968(2):285-299, 11 FIG., 2 TAB.

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AQUAR TERR 15(2):40-45, 5 FIG.

TRUTNAU,LUDWIG
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AQUAR TERR Z 21(4):120-125, 10 FIG.

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TWITTY,VICTOR (SEE GRAD -968HOO: 1354)

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UECK,MANFRED
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ZOOL ANZ 31(SUP):192-204, 5 FIG.

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VISION RES 8:483-488, 3 FIG.

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ARQ ZOOL (S. PAULO) 17(1):1-84, 11 FIG., 8 PL.

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VERNON,C.A. (SEE BANBE-968PNG: 157)
VESELY,ZDENEK (SEE STEO -968EIF: 38)

VETTERLING,JOHN M. AND E.A.WIDMER
1968 EIMERIA CASCABELI SP. N. (EIMERIIDAE, SPOROZOA) FROM RATTLESNAKES, WITH A REVIEW OF THE SPECIES OF EIMERIA FROM SNAKES
J PARASIT 54(3):569-576, 14 FIG.

VIAL,YVES
1968 NAISSANCES CHEZ LES REPTILES
BETES NAT 1968(52):27-29, ILL.

VIAL,MAURICETTE
1968 LE TAPAYA UN LEZARD EXCENTRIQUE
BETES NAT 1968(50):17-19, ILL.

VIGH,B. (SEE TEIT -968GMP: 163)

VILLEGAS,LEOPOLDO AND LAURA SANANES
1968 IONIC PERMEABILITY AND WATER MOVEMENT IN FROG GASTRIC MUCOSA
J GEN PHYSIOL 51(5):226-232, 6 FIG.

VINEGAR,ALLEN
1968 METABOLISM, ENERGETICS AND THERMOREGULATION DURING BRODDING OF SNAKES OF THE GENUS PYTHON (REPTILIA, BOIDAE). DOCTORAL DISSERTATION MS SUBMITTED TO UNIVERSITY OF RHODE ISLAND.
143 P., 32 FIG., 22 TAB.

VIVIEN,JEAN HENRI AND BERTHE ROELS
1968 ULTRASTRUCTURES SYNAPTIQUES DANS L'EPIPHYSE DES CHELONIENS. PRESENCE DE RUBANS SYNAPTIQUES AU NIVEAU DES ARTICULATIONS ENTRE CELLULES PSEUDOSENSORIELLES ET TERMINAISONS NERVEUSES DANS L'EPIPHYSE DE PSEUDEMYS SCRIPTA ELEGANS ET PSEUDEMYS PICTA
COMP REND ACAD SCI (PARIS) D 266(6):600-603, 12 FIG.

VLADESCU,C.
1968 HIBERNAREA LA ANIMALE
NATURA SER BIOL 20(2):12-19.

VOGEL,ZDENEK
1968 EINE NEUE KROETENFORM AUS KUBA
AQUAR TERR 15(3):88-89, ILL.

VONEIDA,THEODORE AND SVEN O.E.EBBESSON
1968 PALLIAL COMMISSURAL SYSTEMS IN THE TEGU LIZARD (TUPINAMBIS NIGROPUNCTATUS)
ANAT REC 160(2):445. (ABSTR)

VRIES,A.DE (SEE DJAM -968FSH: 295)
VRIES,A.DE (SEE KLIC -968EAS: 15)
VYSKOCIL,F. (SEE BERR -968EAF: 493)

---W---

WAKE,DAVID B.
1968 THE EVOLUTIONARY MORPHOLOGY OF SALAMANDERS
J HERPETOL 1(1-4):116. (ABSTR)

WARTENBERG,HUBERT AND HANS GEORG BAUMGARTEN
1968 ELEKTRONENMIKROSKOPISCHE UNTERSUCHUNGEN ZUR FRAGE DER PHOTOSENSORISCHEN UND SEKRETORISCHEN FUNKTION DES PINEALORGANS VON LACERTA VIRIDIS UND L. MURALIS
Z ANAT ENTWICKL GESCH 127(1):99-120, 9 FIG.
(ENG SUMM)

WASSERMAN,AARON O. AND JAMES P.BOGART
1968 CHROMOSOMES OF TWO SPECIES OF SPADEFOOT TOADS (GENUS SCAPHIOPUS) AND THEIR HYBRID
COPEIA 1968(2):303-306, 1 FIG.

WATARI,NAKAZO
1968 FINE STRUCTURE OF NERVOUS ELEMENTS IN THE PANCREAS OF SOME VERTEBRATES
Z ZELLFORSCH MICROSKOP ANAT 85(3):291-314, 15 FIG.

WATKINS,F., R.GEHLBACH AND ROBERT BALDRIDGE
1968 THE ASSOCIATION OF LEPTOTYPHLOPS DULCIS (REPTILIA: SERPENTES) WITH NEIVAMYRMEX NIGRESCENS (INSECTA: FORMICIDAE)
TEXAS J SCI 19(4):447. (ABSTR)

WERMAN,R. (SEE APRMH-968DGN: 583)
WHITAKER,BEATRICE D.L. (SEE JENDH-968ENE: 743)

WHITE,FRED N.
1968 FUNCTIONAL ANATOMY OF THE HEART OF REPTILES
AMER ZOOL 8(2):211-219, 11 FIG.

WHITFORD,WALTER G.
1968 PHYSIOLOGICAL RESPONSES TO TEMPERATURE AND DESICCATION IN THE ENDEMIC NEW MEXICO PLETHODONTIDS, PLETHODON NEOMEXICANUS AND ANEIDES HARDII
COPEIA 1968(2):247-251, 2 FIG., 4 TAB.

WHITFORD,WALTER G. (SEE HUTVH-968RBS: 65)
WHITLOCK,DAVID G. (SEE JOSBS-968CPB: 469)
WHITLOCK,DAVID G. (SEE JOSBS-968CPS: 279)
WHITLOCK,DAVID G. (SEE JOSBS-968SWD: 372)
WIDMER,E.A. (SEE VETJM-968ECS: 569)

WIESER,WOLFGANG AND E.NOPP-PAMMER
1968 DER EINFLUSS DER TEMPERATUR UND DES HAEUTUNGSZYKLUS AUF DIE MELANINSYNTHESE BEI TRITURUS CRISTATUS
ZOOL ANZ 31(SUP):131-139, 5 FIG.

WILLIAMS,KENNETH L.
1968 A NEW SUBSPECIES OF THE TEIID LIZARD CNEMIDOPHORUS INORNATUS FROM MEXICO
J HERPETOL 1(1-4):21-24, 1 FIG.

WILLIAMS,KENNETH L. AND CHARLES M.FUGLER
1968 AN ADDITIONAL RECORD OF PSEUDOERYX PLICATILIS ECUADORENSIS FROM ECUADOR
J HERPETOL 1(1-4):104-105.

WILLIAMS,THEODORE P. AND SUSAN E.MILBY
1968 THE THERMAL DECOMPOSITION OF SOME VISUAL PIGMENTS
VISION RES 8:359-367, 6 FIG., 2 TAB.

WILLMS,CHARLES R. (SEE BOSJD-968CPA: 77)

WILSON,LARRY DAVID
1968 A FRACTURE PLANE IN THE CAUDAL VERTEBRAE OF PLIOCERCUS ELAPOIDES (SERPENTES: COLUBRIDAE)
J HERPETOL 1(1-4):93-94, 1 FIG.

WOHLTMANN,HULDA J. AND H.T.NARAHARA
1968 STUDIES RELATED TO THE CONCEPT THAT A THIOL DISULFIDE INTERCHANGE IS INVOLVED IN THE ACTION OF INSULIN ON MUSCLE CELLS
BIOCHIM BIOPHYS ACTA 150(3):500-508, 3 TAB.

WOHNUS,J.F. (SEE KILS -968CAR: 78)
WOLFE,HUBERT J. (SEE MILNR-968NLA: 447)

WOLFF,J., K.HORISAKA AND H.M.FALES
1968 ON THE STRUCTURE OF OPHIDINE
BIOCHEMISTRY 7(7):2455-2457, 1 FIG.

WOOL,D. (SEE KUGJ -968CDH: 76)

WORKMAN,WILTON M. (SEE HUMAA-968SAE: 266)

WORTH,C.B., W.G.DOWNS, T.H.G.AITKEN AND E.S.TIKASINGH
1968 ARBOVIRUS STUDIES IN BUSH BUSH FOREST, TRINIDAD, W. I., SEPTEMBER 1959-DECEMBER 1964. IV. VERTEBRATE POPULATIONS
AMER J TROP MED HYG 17(2):269-275, 1 FIG., 5 TAB.

WRIGHT,DAVID A. AND FRANK H.MOYER
1968 INHERITANCE OF FROG LACTATE DEHYDROGENASE PATTERNS AND THE PERSISTENCE OF MATERNAL ISOZYMES DURING DEVELOPMENT
J EXP ZOOL 167(2):197-205, 2 TAB., 2 PL.

WRIGHT,JOHN W.
1968 VARIATION IN THREE SYMPATRIC SIBLING SPECIES OF WHIPTAIL LIZARDS, GENUS CNEMIDOPHORUS
J HERPETOL 1(1-4):1-20, 4 FIG., 2 TAB.

WRIGHT,JOHN W. (SEE LOWCH-968NPS: 1)

----X----

XAVIER,FRANCOISE (SEE OZOR -968BVS:1173)

----Y----

YAMAKAWA,M. (SEE SAWY -968HAR: 304)

YANG,C.C. (SEE SHUIC-968SIL: 295)

YONEYAMA,YOSHIMASA (SEE SUGY -968HUE: 291)

YOSHIMURA,F. AND K.HARUMIYA
1968 DEMONSTRATION OF INTERMEDIARY CELL BETWEEN LIPID CELL AND SUMMER CELL IN ADRENAL CORTEX OF BULLFORGS
ENDOCRINOL JAP 15(1):94-100.

----Z----

ZACHRY,JOEL G.
1968 WATER MOCCASIN
TENNESSEE CONSERV 34(5):8-9, ILL.

ZACHRY,JOEL
1968 THE RATTLESNAKES
TENNESSEE CONSERV 34(6):15-16, ILL.

ZACUNAISKY,JOSE A., JOSEPH F.GENNARO,JR.,
NASSER BASHIRELAHI AND MARY HILTON
1968 INTRACELLULAR REDISTRIBUTION OF SODIUM AND CALCIUM DURING STIMULATION OF SODIUM TRANSPORT IN EPITHELIAL CELLS
J GEN PHYSIOL 51(5):290-302, 12 FIG.

ZAGORULKO,T.M.
1968 THE EVOKED POTENTIALS OF THE GENERAL CORTEX AND TECTUM OPTICUM OF THE TORTOISE IN RELATION TO THE INTENSITY AND WAVE LENGTH OF PHOTIC STIMULUS
FIZIOL ZH SSSR 54(4):436-446, 5 FIG.
RUSSIAN (ENG ABSTR)

ZALOGLU,SUEKRIYE
1968 TAXONOMY OF THE GENUS BLANUS (AMPHISBAENIDAE, REPTILIA) IN TURKEY
EGE UNIV FEN FAK ILMI RAP SER (57):1-15.

ZAVALA,ALBERT
1968 CLASSICAL CONDITIONING IN FROGS (RANA PIPIENS)
J HERPETOL 1(1-4):83-85, 3 FIG.

ZUG,GEORGE R.
1968 DISTRIBUTION AND VARIATION IN THE FLORIDA WORM LIZARD, RHINEURA FLORIDANA
J HERPETOL 1(1-4):116-117. (ABSTR)

ZWEIFEL,RICHARD G.
1968 EFFECTS OF TEMPERATURE, BODY SIZE, AND HYBRIDIZATION ON MATING CALLS OF TOADS, BUFO A. AMERICANUS AND BUFO WOODHOUSII FOWLERI
COPEIA 1968(2):269-285, 10 FIG., 4 TAB.

ZWEIFEL,RICHARD G.
1968 (REVIEW OF) THE SYSTEMATICS AND ZOOGEOGRAPHY OF THE AMPHIBIA OF BORNEO BY ROBERT F.INGER
COPEIA 1968(2):426-427.

ZWEIFEL,RICHARD G.
1968 RANA MUSCOSA
CAT AMER AMPHIBIANS REPTILES :65, 1 MAP.

ZWEIFEL,RICHARD G.
1968 RANA TARAHUMARAE
CAT AMER AMPHIBIANS REPTILES :66, 1 MAP.

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SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles. Regular dues are $4.00 worldwide and should be remitted (preferably via international money order outside the U. S. A. and Canada) to the Secretary-Treasurer. Members are invited to subscribe to the higher categories of Sustaining ($5.00), Contributing ($15.00), or Life ($100, in four payments of $25.00) membership. Institutional subscription is $6.00. A complete list of publications of The Ohio Herpetological Society and the Society for the Study of Amphibians and Reptiles is available from the Publications Secretary.

HERPETOLOGICAL REVIEW

Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor. (address at top left)

NEXT SOCIETY MEETING: See page 3.

Herpetological Review

number 3 *** july 1968

•CONTENTS

Page

3 Next SSAR Meeting: Registration, Call for Papers, Call for Photographs

3 Amphibian Tumor Symposium in New Orleans (October)

4 The Columbus Zoo's New Reptilia-Amphibia Hall: A New Approach to Design, by Louis Pistoia

7 L. M. Klauber (1883-1968)

7 Second Herpetological Conference of the U. S. S. R., by P. V. Terent'ev

8 New Books and Reprints

9 Current Herpetological Titles, II: 1967-1968, by H. G. Dowling, Itzchak Gilboa, and Irene Palser

■■■■

SSAR meeting

SSAR MEETING NEXT MONTH.

The Society will hold its eleventh annual meeting next month (23-25 August) at Mountain Lake Biological Station, located in western Virginia near Blacksburg; details and photos may be found in Herpetological Review no. 2, p. 5.

A REGISTRATION BLANK IS ENCLOSED IN THIS MAILING. This is to be returned to Dr. James A. Organ, Mountain Lake Biological Station, Route 1, Pembroke, Virginia 24136. Registration will be limited by the size of the Station's auditorium which seats 100, so be sure to register early if you plan to attend. The definitive program will be mailed about August 1st. Camping facilities are available nearby and details may be obtained by writing Dr. Organ.

.....CALL FOR PAPERS.....

A number of paper titles have already been submitted. In addition, the Society has invited two leading specialists to present lectures on Saturday, 24 August. These persons are Dr. Carl Gans (Department of Biology, State University of New York at Buffalo) and Dr. Richard Highton (Department of Zoology, University of Maryland); titles will be announced in the official program.

IF YOU WISH TO GIVE A PAPER, fill in the enclosed form and return it to Dr. Organ at once; titles received after July 20th cannot be listed in the program. Be sure to indicate needed projection equipment. Papers may not be presented by title only.

Those persons who wish to submit photos for the display are asked to send them at once to Kraig Adler, Museum of Zoology, The University of Michigan, Ann Arbor, Michigan 48104. Black-and-white or color enlargements of any species are acceptable; be sure to list species and locality. Photos will be returned immediately after the meeting.

●

SYMPOSIUM ON AMPHIBIAN TUMORS.

A three-day symposium on amphibian tumors will be held at the Royal Orleans Hotel in New Orleans, Louisiana, starting Monday, 28 October. If you wish to attend, please register with Dr. Merle Mizell, Department of Biology, Tulane University, New Orleans, Louisiana 70118. Topics to be covered include amphibian cells in vitro, immunity, viruses, lymphosarcoma, Lucké Renal Adenocarcinoma, and biologically defined strains of Amphibia. It is planned that the proceedings of this symposium will be published as a monograph of the Journal of the National Cancer Institute.

A NEW DESIGN FOR ZOO REPTILE HOUSES

THE COLUMBUS ZOO's NEW REPTILIA-AMPHIBIA HALL: A new approach to design

by Louis Pistoia, Curator of Reptiles and Amphibians, Columbus Zoological Gardens, Powell, Ohio.

★★★★★

IT IS quite surprising that zoo reptile houses continue to be designed and built along those old, conventional lines which stress work corridors and exhibit walls alongside the building periphery, accentuated by one or two display islands in the center of the building. Constant exposure to such structures sooner or later reveals the inherent faults in this archaic architectural plan. Reptilia-Amphibia Hall's basic and original scheme is a genuine attempt to correct obvious flaws and not just a frilled duplication of the conventional design. After many preliminary sketches and consultation with the architects, master-planners, engineers, contractors and landscapers the final plan was chosen.

BASIC DESIGN

Reptilia-Amphibia Hall is circular, 124 feet in diameter, with 16 sides, each tangent to the circle (Fig. 1.). Each wall is interrupted at the corners by rough-sawn cedar louvres the full height of the walls - there are functional as well as decorative and there are corresponding double-doors to the inside. During favorable weather these doors can be opened, the cupola fan turned on, and fresh air drawn into the visitors' area. The outside walls are stucco on concrete block (Fig. 2.) and the inside facing is of special mould lending a decorative pattern to the walls. The entire roof, including the cupola, is finished in black asphalt shingle over rigid insulation and a wood deck supported on laminated wood beams; the deck and beams constitute the finished ceiling in the peripheral corridors and central area - the three remaining corridors have low, flush, plastered ceilings. There is not a single window or skylight in the entire building. An eight-foot concrete walk encircling the building is protected by the roof's overhang. The two entrances are 45 degrees apart, each with four glass-framed doors and a column of native stone running down the middle. Both entrances are encompassed by a wide and walled (native stone) veranda overlooking a large, asphalt-bottomed pool; the pool has a riprap of limestone rocks and boulders. Wide steps lead up to the entrances while in the back a ramp extends to a double-door emergency exit.

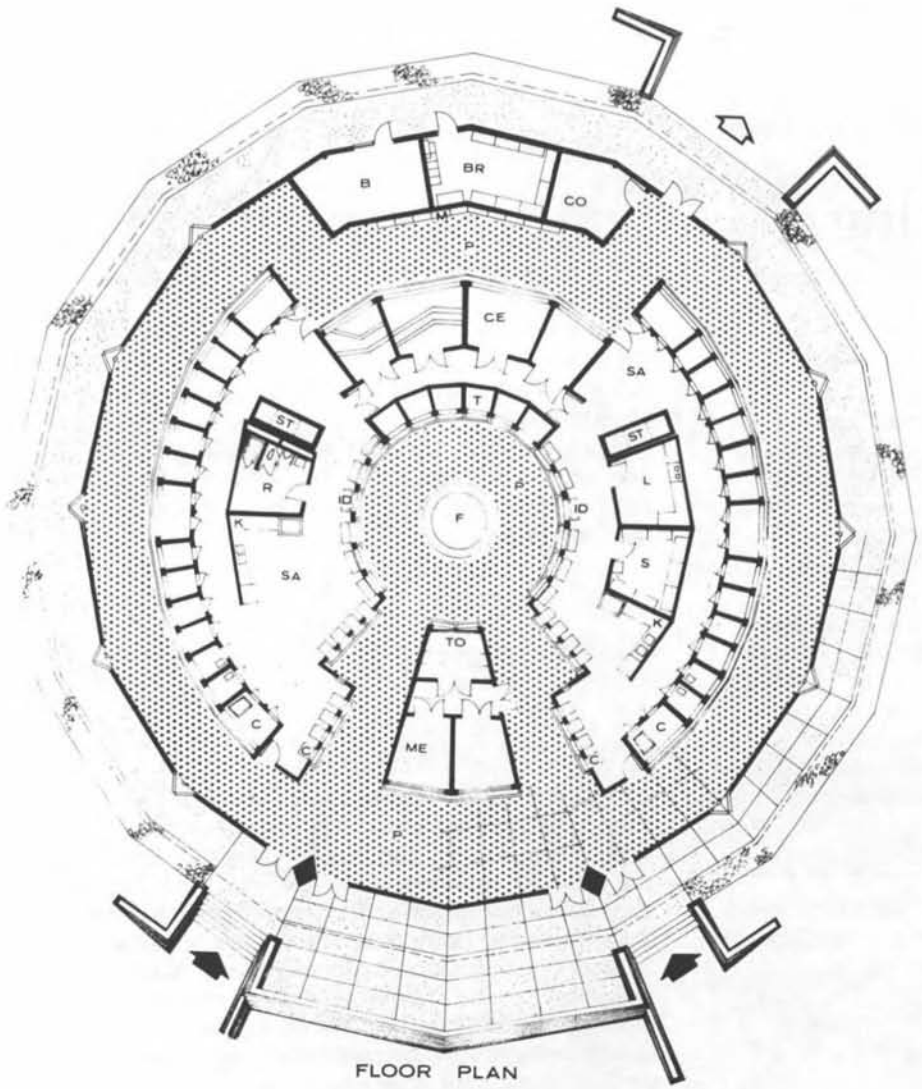


FIGURE 1. Floor plan of Reptilia-Amphibia Hall. Stippling shows public areas (P); arrows show entrances and emergency exit. Legend: C, cages; CE, crocodilian enclosures; ID, interchangeable displays; ME, marine exhibits; TO, tortoises; B, boiler room; BR, breeding room; CO, curator's office; F, fountain; K, kitchen; L, laboratory; M, museum cases; R, restroom; S, surplus; SA, service area; ST, surplus tanks; T, tanks.

If those familiar with the old conventional design of reptile houses will glance at the floor plan of Reptilia-Amphibia Hall they will notice that the major change from that design has been the complete interchange of display and public areas. The new design offers two display corridors on either side of a frontal display island. These are accessible to a core area complete with a central fountain twelve feet in diameter. An overall effect of a keyhole surrounded by displays has been adapted and serves well to avoid the monotony of having the viewing area solely around the periphery. The advantages of this fresh approach are numerous. One of the main differences is an immediate introduction to a continuous one-sided display, eliminating the viewer's need to bounce from one display wall to another, such as an island wall. Removing this back and forth movement definitely improves traffic flow, although I personally feel that there is no permanent solution to this problem when dealing with large crowds; and nothing is worse than having to wait in line to see something. However, here it is possible for one to choose any of four directions, easily pass a congested spot without bumping into traffic along an opposite wall, and continue to view the exhibits.

In the old-type reptile house all visitors are contained within the ring of heated displays with resulting discomfort. But in this new Hall, because of the adopted interchange of public and exhibit areas, the majority of the viewers will be to the outside of the displays, where it is cooler and the air is fresher. It was customary, in the old plan, to leave the crocodilian enclosure exposed (without glass). This resulted in the escape of needed heat from the enclosures into the public area, where it became excessive for human comfort. In Reptilia-Amphibia Hall all displays, including the crocodilian enclosures, are behind glass, thus confining the needed heat and at the same time eliminating the problem of wanton visitors throwing refuse or spitting at the animals.



FIGURE 2. Front view of Reptilia-Amphibia Hall.

The most important single innovation of the new Hall, however, is the aesthetic impact of its plan upon the visitor. As a person enters the Hall he is confronted with a massive exhibit, but he receives only a glimpse of the whole -- the rest is left to his imagination and eventual exploration. His excitement may run keen as he peers through the core corridor and sees the fountain with its spray of water (Fig. 3.). He is also aware that beyond the island exhibit there is a central display room, other than the corridor displays and the wall of large peripheral cages. Only a portion of these peripheral cages is visible to him because the wall curves away from his line of vision. And later, when he makes the turn around the far corner of this curved wall, he is suddenly confronted with crocodilian enclosures fifty feet in total length. Surely this continuing discovery of displays lends to the Hall's potential as an exciting experience - and a right step in the art of display.

In contrast, consider the old approach. In most cases, merely standing inside the entrance the visitor sees almost the entire exhibit and all that is left for him is the inspection of the individual units. Since he has already noticed these sections, there results both a loss of impact and display value.

SERVICE AREAS

The two main service areas are enclosed by the displays and connected to each other by a service corridor, the latter to service both the crocodilian enclosures and the aquatic tanks opposite them. Within one service area is a laboratory, a surplus room, an L-shaped kitchen with formica counters, base and wall cabinets, double-basin stainless steel sink (with waste disposal), plus a large stainless steel sink (with booster heater) and refrigerator. The opposite area repeats the kitchen (with freezer) and large sink plus a complete rest room. Each service area also has a long concrete tank, with removable partitions, for surplus crocodilians, turtles, etc.

DISPLAYS

The two peripheral display walls, with their large cages of two sizes, are constructed of concrete block and cement plaster. The adjoining walls are of cement plaster over concrete block (unlike the thin walls prevalent in most reptile houses). All of these cages are individually drained (indirect draining) - the pools drained separately from the floors. Tempered water is piped not only to these pools, but also to the crocodilian pools, aquatic tanks, tortoise pool and marine displays. The cages are lighted by special fluorescent fixtures which contain heat ducts. Their use permits a smaller opening in the top of each cage, thus insuring that the heat reaches the floor of the cage (where the reptile is). There are also other light fixtures, permitting the use of sunlamps, heat lamps or special effect lamps. In addition, the larger cages have thermowire installed in the top to radiate extra heat when needed. The last three units, on the right side, are air-conditioned for any reptiles requiring lower temperatures -- they still can be used conventionally. All doors to these large units are dutched, as are the doors to the crocodilian enclosures. Instead of the usual key and lock, or padlock installation, which necessitates the use of both hands to open (this is a very bad safety feature), a single action cam lock is used, requiring the use of only one hand.

The six aquatic tanks are constructed of concrete, with laminated glass fronts. All are filtered and drained separately, the two end ones equipped with special salt-water filters. The marine (sea-turtle) displays are also filtered and drained separately. Unlike the aquatic tanks, where the specimens are viewed through the water, here the specimens are seen from above the water level. Special light fixtures have been installed to withstand the corrosive action of salt in the atmosphere -- the glass frames are also protected against this corrosion. Double doors lead to the marine displays as well as to the large tortoise enclosure, crocodilian enclosures and the two main service areas to accomodate the transfer of large specimens. The tortoise and crocodilian enclosures have both land and pool areas. The use of glass fronts for these displays not only stops anything from being thrown at the specimens but it also possibilitates for a closer viewing of specimens.



FIGURE 3. View through corridor showing tiered cages and central area. This is repeated on the opposite side of the display island. All photographs by Robert Kondik (Columbus Zoo).

The two corridor displays, on either side of the island displays, have a total of 32 tiered cages. These are constructed of mahogany plywood -- to show the mahogany finish as a background. They are free-moving behind deep formica frames. The sign openings are located in the frames between the tiers and on a separate plane from that of the cage fronts. Translucent signs are serviced from behind-the-scenes and illuminated by the lights to the lower tier of cages.

The core display is a showroom by itself. The wall above the displays is finished in rough cork. The dome of the building, with its wood deck and laminated beams, is exposed to view. Aside from the aquatic tanks and tortoise displays, already mentioned, the area contains interchangeable displays -- a total of twelve openings, with interchangeable panels and movable shelves and lights. Each accomodates varied sizes of displays. The design has flexibility in that it will enable a showing of from 12 to 48 displays, possibly more, according to the needs of the collection.

At the back of the building are the boiler room, breeding room (for rats and mice) and curator's office, the latter available to public business and not buried behind-the-scenes. The common wall to these areas, opposite the crocodilian enclosures, contains 30 feet of museum showcases. The mezzanine is located above this area with a floor area of 2500 square feet. Located here are the multi-zone heating and air-conditioning units, hot water storage tank, tempered water units, controls, and the two salt-water filters for the end aquatic tanks. A percentage of fresh air is continually brought in to the displays through supply plenums. Part of the mezzanine is the exhaust area, with two large fans, for removing the foul air from the building; this is exclusive of the cupola fan which exhausts the public area.

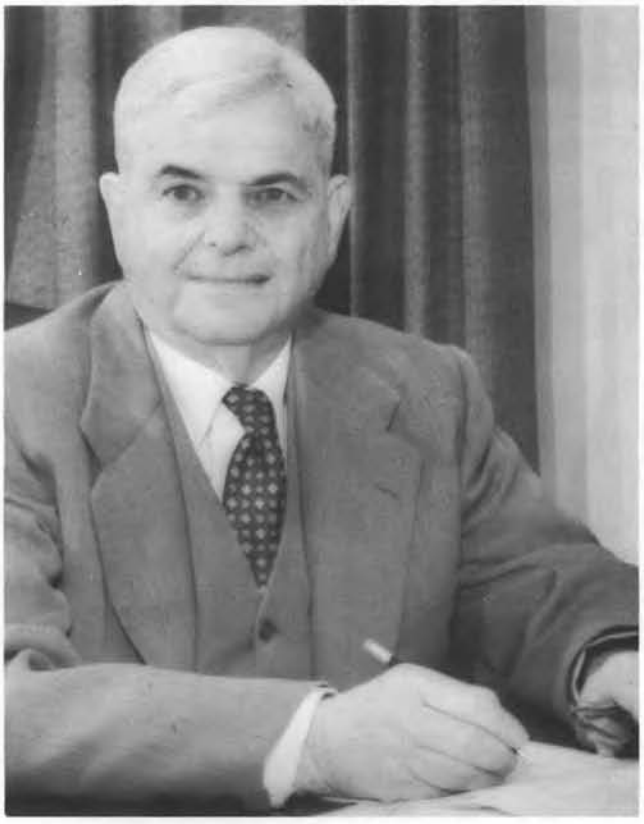
Though a number of details have not been discussed, it should be mentioned that the Hall is complete with alarm, intercom and telephone systems, plus a music and public address system.

Construction of Reptilia-Amphibia Hall started October 24, 1966, and public admittance started April 13, 1968. The project was financed by the City of Columbus, Ohio, and cost $428,000.00 exclusive of the architects' fees. It is the first new building in the Zoo's masterplan. We feel it is a good start.

[The Zoo's collection is equally as exciting as its new Hall. We anticipate a companion article on the collection for a future issue of the Review. - Ed.]

■■■

L. M. KLAUBER



Laurence Monroe Klauber, 84, died after a long illness on 8 May 1968 in San Diego, California. He was born there in 1883 and rose from salesman to president and chairman of the board of the San Diego Gas and Electric Co., retiring in 1953. He was educated at Stanford (A. B., 1908) and received an honorary degree from his alma mater's rival, the University of California, Los Angeles (LL. D., 1941). It was this last-named institution that published his monumental 2-volume "Rattlesnakes, their habits, life histories, and influence on mankind" in 1956; Dr. Klauber was working on a revision of this book at the time of his death. He will be remembered by herpetologists for his careful taxonomic studies on the reptiles of the Southwest and particularly for his application of statistical methods in herpetology.

He was long associated with the San Diego Natural History Society and the San Diego Zoological Society where he published most of his papers; his extensive library and collections will be deposited at the Museum. He served as president of the American Society of Ichthyologists and Herpetologists (1938-1940) and the Society of Systematic Zoology (1955), and had been a sustaining member of the Society for the Study of Amphibians and Reptiles since its founding in 1958.

SECOND HERPETOLOGICAL CONFERENCE OF THE U.S.S.R.

The second all-union herpetological conference was held in Leningrad 14-16 November 1966. Altogether 65 participants from 20 cities registered. The conference was opened with an introductory speech by Academician B. E. Bykhovskii.

P. V. Terent'ev (Leningrad) reported on the problems of Soviet herpetologists in connection with the International Biological Program, I. S. Darevskii (Leningrad) on the principles and methods of studying the secondary productivity of terrestrial ecosystems in Warsaw in August, 1966, and A. G. Bannikov (Moscow) on the Ninth General Assembly of the International Union on Conservation in Lausanne in 1966.

After the informational reports, A. M. Alekperov (Baku) spoke on the significance of meteorological factors in the lives of amphibians and reptiles, V. A. Garanin (Kazan) on methods of censusing amphibians, Îu. P. Antipchuk (Kiev) on the function of the three-chambered heart in reptiles, G. A. Gimmelreich (Kiev) on the nature of the velum palatinum in crocodiles, Îu. P. Antipchuk (Kiev) on the functional morphology of the pulmonary vessels in reptiles, Îu. D. Chugunov (Moscow) came out against the hypothesis on the role of the pineal organ in the regulation of color change in amphibians, L. F. Nayarenko (Odessa) informed us about changes in the population numbers of lizards and snakes in the northeastern Black Sea region, G. A. Ishunin (Tashkent) about poisonous snakes in southern Uzbekistan. A paper by V. V. Kuznetsov (Alma Ata) was read, "On fossil turtles in the Kirghiz."

On the following day T. T. Talyzin (Moscow) spoke on the role of deceased Academician E. N. Pavlovskii in the study of poisonous animals. Afterward there followed the report of I. S. Darevskii (Leningrad) on the First International Symposium on Poisonous Animals and Their Poisons in Brazil in 1966, O. M. Bogomolets-Enrikes (Moscow) on poisonous Brazilian snakes, O. P. Bogdanov (Tashkent) on problems in the investigation of poisonous snakes in the USSR, T. T. Talyzin (Moscow) on antivenins, and A. A. Khutorianskii (Moscow) on reptile pathology.

Z. T. Barkagen (Barnaul) gave a review of the use of snake venom in medicine. The reports of T. A. Val'tseva (Moscow) on the destruction in the central nervous system caused by poisoning with cobra venom, V. T. Shevchenko and L. Sh. Mitel'man (Barnaul) on "The use of snake venoms for studying the thrombotic activity of lipids," and others, were of a more specialized nature.

On the last day L. P. Tatarinov (Moscow) reported on phylogenetic investigations in paleoherpetology, and L. I. Khozatskii (Leningrad) spoke on the evolution of armor in amphibians and reptiles. In addition, P. V. Terent'ev (Leningrad) reported on

"The monster of Lake Loch-Ness and Cheir," and there was a series of reports on specialized questions on the study of reptiles and amphibians.

The conference noted the necessity of regulating the excessive collecting of poisonous snakes in some instances.

It is planned to convene the third herpetological conference in two or three years.

P. V. Terent'ev

[Translated from Zool. Zhur. 46(9): 1431 (September, 1967) by Robert J. Winter. A contribution of GENERA OF REPTILES, American Museum of Natural History, New York City 10024]

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New Books & Reprints

Bronn's Klassen und Ordnungen des Tierreichs. Herpetological sections by C. K. Hoffmann. Reprinted 1967; all paperbound. Amphibia (1873-1878), $46.00; Reptilia, vol. 1, Turtles (1890), $35.00; vol. 2, Lizards (1890), $66.00; vol. 3, Snakes and Embryology of Reptiles (1890), $44.00. Available from R. Friedländer & Sohn, 1 Berlin 41 (Steglitz), Germany.

Das Tierreich. Recent herpetological parts:

80. Gekkonidae, Pygopodidae, Xantusiidae, by H. Wermuth, 246 p., $29.00.
81. Colubridae (Dipsadinae) by J. Peters, 20 p., $4.00.
83. Chamaeleontidae, by R. Mertens, 37 p., $6.50.
84. Uropeltidae, by C. Gans, 29 p., $3.50.
85. Ascaphidae, Leiopelmatidae, Pipidae, Discoglossidae, Pelobatidae, Leptodactylidae, Rhinophrynidae, by S. Gorham, 182 p., $27.00.
86. Agamidae, by H. Wermuth, 127 p., $18.00.

Available from R. Friedländer & Sohn (address above)

Zoological Record. Herpetological portions on microcards (vols. 1-85, 1864-1948), $56.00. Available from R. Friedländer & Sohn (address above).

Biologia Centrali-Americana, vol. 7: Reptilia and Batrachia, by A. Günther, reprinted 1966, paperbound, $35.00. 498 p., 76 pls. (black and white only) Available from R. Friedländer (address above).

Amphibians of Malawi [East Africa], by Margaret M. Stewart. 173 p., 67 figs., 20 color plates, 1967. $7.50 clothbound. Available from State University of New York Press, Albany, New York 12201.

Poisonous Snakes of the World, edited by S. A. Minton, Jr., H. G. Dowling, and F. E. Russell. Publ. U. S. Dept. Navy, Bureau of Medicine & Surgery. 212 p., 8 color plates, 1968. $3.25 clothbound from Supt. Documents, U. S. Government Printing Office, Washington, D. C. 20402.

International Symposium on Animal Venoms. Results of symposium held in São Paulo, Brazil, 17-23 July 1966. 347 p., available from Instituto Butantan, São Paulo. Includes sections on immunology, pathology of evenomation, prevention of accidents, and a long section on taxonomy of venomous animals.

There are 38 separate contributions. Some of the authors are B. Lutz, D. Cochran, J. R. Bailey, L. D. Brongersma, I. S. Darevsky, R. Mertens, A. Shulov, K. Klemmer, H. Saint-Girons, T. W. Betz, W. Beçak, A. Fain, N. C. McCollough, F. Kornalik, P. A. Christensen, A. do Amaral, A. Ohsaka, P. Cohen, and others. Titles are included in the Current Herpetological Titles list in this issue of the Review.

Amphibiens Urodèles de la Chine, by M. L. Y. Chang. 1936 (reprinted 1968). 165 p., 5 plates. The introduction by Arden H. Brame, Jr., includes a new, up-to-date checklist of Chinese salamanders. This book has just been published and copies will soon be sent to those who ordered them. For those who have not yet purchased a copy, please remember that these prices will be doubled shortly.

- Members: $3.00 paperbound; $5.00 cloth.
- Institutions: $6.00 paperbound; $10.00 cloth.

Send order to the Publications Secretary, SSAR: H. C. Seibert, Department of Zoology, Ohio University, Athens, Ohio 45701.

Style Manual for Biological Journals. 2nd edition, 2nd printing, 1967. 117 p., $3.00. Available from AIBS, 3900 Wisconsin Ave., NW, Washington, D. C. 20016, Attn.: Mr. Frank LoVerde; orders must be prepaid.

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Current Herpetological Titles, II: 1967-1968

By H. G. Dowling, Itzchak Gilboa, and Irene Palser

GENERA OF REPTILES, American Museum of Natural History, New York, New York 10024.

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THIS second list of current herpetological titles (see Herpetological Review no. 2 for first list) includes all 1968 titles received to 15 May and all 1967 titles that have come to our attention in the period 1 April to 15 May. A few titles have been obtained from secondary sources. Like the first list, this one is photo-offset reproduction of computer printout.

FUTURE: The file on 1967 literature is simply a list of titles, but the literature will be cross-indexed beginning with the 1968 list. This index is primarily for use with the overall Bibliography of Herpetology, and we have not decided whether or not to publish indices with the quarterly lists.

ACKNOWLEDGMENTS: The list was prepared with the aid of several departments of the Museum, and the Department of Zoology and Computer Laboratory of the University of Rhode Island. The project is supported by the National Science Foundation (NSF GN-707).

ON USING THE LIST: The list is arranged, as is customary, alphabetically by author, followed by the date, title, and journal reference. However, the names of junior authors are referred to the proper citations by "SEE" lines that are in the form of a code. Note, for example, the reference under "AMORIM, F. O." that says (SEE SCHG -967DVN: 135). The "SCHG" refers to a paper by Schreiber, G. . . . and F. O. Amorim (the code is derived from the first three letters of Schreiber's family name and the initial letters of his [first two] given names). The "967" is the year of publication, minus the initial "1", and the following "DVN" is derived from the initial letters of the first three significant words of the title (or subtitle, if the paper is one of a series). The number "135" after the colon is the initial page number of the article.

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ANON
1968 AMERICAN ALLIGATOR
SASKATCHEWAN NAT HIST SOC NEWSL 18:8-8A.

ANON
1968 COBRA VENOM CAN HAVE ITS USES
NEW SCI 37(583):317.

ANON
1968 THE GATOR -- UNLOVABLE LIVING FOSSIL
CONSERV NEWS 33(6):8-9.

ANON
1968 IDENTIFICATION DU VENIN SUR LA VICTIME DU SERPENT
SCI PROGR NAT 1968(3394):78.

ANON
1968 JUNGLE TREK FOR 19 GRAMS OF VENOM
MED WORLD NEWS 1968:41.

ANON
1968 OUR SLIPPERY FRIENDS ... THE SALAMANDERS
NAT WILDL 6(3):48-51, ILL. (SOME COL.)

ANON
1968 TURTLES TO THE SEA
THE SCIENCES (N.Y. ACAD SCI) 8(3):28-31.

ABERCROMBIE,M. AND JEAN BRACHET (EDS.)
1967 ADVANCES IN MORPHOGENESIS. VOL 6. ACADEMIC PRESS, NEW YORK. VIII + 331 P., ILL.

ABRAHAM,A.
1967 PHYLOGENESIS OF THE NERVE CELL, P. 259-270, 15 FIG., IN, R.HASSLER AND H.STEPHAN (EDS.) EVOLUTION OF THE FOREBRAIN. PLENUM PRESS, NEW YORK.

ACHER,R., J.CHAUVET AND M.T.CHAUVET
1968 LES HORMONES NEUROHYPOPHYSAIRES DES REPTILES: ISOLEMENT DE LA MESOTOCINE ET DE LA VASOTOCINE DE LA VIPERE VIPERA ASPIS
BIOCHIM BIOPHYS ACTA 154(1):255-257.

ADACHI,KOZABURO, LEE-JING CHEN AND H.J.SALLACH
1968 STUDIES ON ALDOLASE ISOZYMES DURING AMPHIBIAN DEVELOPMENT. I. EVIDENCE FOR THE PRESENCE OF TWO TYPES OF ALDOLASE IN EGGS FROM RANA PIPIENS
BIOCHEM BIOPHYS RES COMM 30(4):343-349, 2 FIG., 1 TAB.

ADAMS,BRYANT L. (SEE TUAT -968PRA: 760)

ALJURE,EMILIO F. AND LUIS M.BORRERO
1968 THE EVOLUTION OF FATIGUE ASSOCIATED WITH ISOMETRIC CONTRACTION IN TOAD SARTORIUS
J PHYSIOL 194(2):289-303, 5 FIG.

ALOOF-HIRSCH,SARAH, ANDRE DE VRIES AND ARIEH BERGER
1968 THE DIRECT LYTIC FACTOR OF COBRA VENOM: PURIFICATION AND CHEMICAL CHARACTERIZATION
BIOCHIM BIOPHYS ACTA 154(1):53-60, 6 FIG.

ALTNER,HELMUT
1968 UNTERSUCHUNGEN AN EPENDYM UND EPENDYMORGANEN IM ZWISCHENHIRN NIEDERER WIRBELTIERE (NEOCERATODUS, URODELEN, ANUREN)
Z ZELLFORSCH 84(1):102-140.

ALVARADO,RONALD H. (SEE PARRH-968ETW: 61)

AMARAL,A.DO
1967 VENOM AND ANTIVENIN SPECIFICITY: MODERN CONCEPT
MEM INST BUTANTAN 33(1):293-303.

AMORIM,F.O. (SEE SCHG -967DVN: 135)

ANDERSON,ALAN H.
1968 LIFE IN THE RIVER OF GRASS
NAT SCI 5(16):5-7, ILL.

ANDERSON,JAMES D.
1968 THERMAL HISTORIES OF TWO POPULATIONS OF AMBYSTOMA MACRODACTYLUM
HERPETOLOGICA 24(1):29-35, 3 FIG., 1 TAB.

ANDERSON,STEVEN C.
1968 A CASQUE-HEADED FROG FROM SINALOA
PACIFIC DISCOVERY 21(2):25-27, 3 FIG.

ANTONINI,ERALDO (SEE BRUM -968EKR: 519)

APPLEBY,LEONARD
1968 WHEN SNAKES PLAY A GAME OF BLUFF
THE FIELD 231(6003):170-171, 4 FIG.

ARRONET,V.N.
1968 THE KARYOTYPE OF LIZARD OPHYSOPS ELEGANS MENETRIES
CYTOLOGY 10(1):120-122, 1 FIG. (RUSS ENG SUMM)

ARNDT,RUDOLF G. (SEE SMIHM-967NSG: 1)

ARNOULT,J. AND M.LAMOTTE
1968 LES PIPIDAE DE L'OUEST AFRICAIN ET DU CAMEROUN
BULL INST FOND AFR NOIRE SER A SCI NAT 30(1):270-306, 31 FIG.

ASHLEY,BILL D. (SEE KOCWF-968ERA: 165)

ASHLEY,B.D. (SEE KOCWF-968IRV: 153)

ASHLEY,BILL D. (SEE KOCWF-968ISN: 159)

ASHLEY,H., P.KATTI AND E.FRIEDEN
1968 UREA EXCRETION IN THE BULLFROG TADPOLE: EFFECT OF TEMPERATURE, METAMORPHOSIS, AND THYROID HORMONES
DEVELOP BIOL 17(3):293-307, 7 FIG., 3 TAB.

ATKINS,LEONARD (SEE GORGC-968CXS: 159)

ATKINS,LEONARD (SEE GORGC-968NHT:1358)

ATKINS,LEONARD (SEE GORGC-968NKD: 13)

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AUGUSTYN,J.M. (SEE ELLWB-968SAS: 411)

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BAILEY,J.R.
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MEM INST BUTANTAN 33(1):67-72.

BAKER,ROBERT E. (SEE JACM -968NSC: 543)

BALLINGER,ROYCE E. AND DONALD W.TINKLE
1968 A NEW SPECIES OF UTA (SAURIA: IGUANIDAE) FROM SALSIPUEDES ISLAND, GULF OF CALIFORNIA, MEXICO
OCC PAP MUS ZOOL UNIV MICH 1968(656):1-6.

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BANNISTER,L.H.
1968 FINE STRUCTURE OF THE SENSORY ENDINGS IN THE VOMERO-NASAL ORGAN OF THE SLOW-WORM ANGUIS FRAGILIS
NATURE 217(5125):275-276, 2 FIG.

BARBIERI,FRANCISCO D. (SEE PISA -967ACV: 1)

BARBOUR,CLYDE D. (SEE ROSFL-968ERC: 159)

BARBOUR,ROGER W.
1968 THE DUSKY SALAMANDER
KENTUCKY HAPPY HUNTING GROUND, DEPT FISH WILDL RESOURCES, 24(1):37, ILL.

BARBOUR,ROGER W. (SEE HARMJ-968MEW: 39)

BARDACK,DAVID
1968 FOSSIL VERTEBRATES FROM THE MARINE CRETACEOUS OF MANITOBA
CAN J EARTH SCI 5(1):145-153, 9 FIG., 3 TAB.

BARME,MICHEL
1968 VENOMOUS SEA SNAKES (HYDROPHIIDAE), P. 285-308, 3 FIG., 3 TBLS., IN W.BUECHERL, E.E.BUCKLEY AND V.DEULOFEU (EDS.) VENOMOUS ANIMALS AND THEIR VENOMS.
ACADEMIC PRESS, NEW YORK.

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SCOTT, FORESMAN AND CO., GLENVIEW, ILL., 1-274, ILL. (PAPER)

BARTH,LESTER G. AND LUCENA J.BARTH
1967 THE UPTAKE OF NA-22 DURING INDUCTION IN PRESUMPTIVE EPIDERMIS CELLS OF THE RANA PIPIENS GASTRULA
BIOL BULL (PENNA) 133(3):495-501, 4 TAB.
BARTH,LESTER G. (SEE BARLJ-968FSD: 272)
BARTH,LUCENA J. AND LESTER G.BARTH
1968 FURTHER STUDIES OF DIFFERENTIATION OF CELLS FROM HYBRID GASTRULAE
DEVELOP BIOL 17(3):272-292, 1 FIG., 5 TAB.
BARTH,LUCENA J. (SEE BARLG-967UND: 495)
BARTLETT,HAZEL AND ANDREA R.P.RHODES (EDS.)
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BASTIDE,FRANCOISE AND SERGE JARD
1968 ACTIONS DE LA NORADRENALINE ET DE L'OCYTOCINE SUR LE TRANSPORT ACTIF DE SODIUM ET LA PERMEABILITE A L'EAU DE LA PEAU DE GRENOUILLE. ROLE DU 3',5'-AMP CYCLIQUE
BIOCHIM BIOPHYS ACTA 150:113-123, 5 FIG., 4 TBLS. (ENG SUMM)
BASTIDE,FRANCOISE (SEE JARS -968ARD: 124)
BAUMGARTEN,H.G. AND H.BRAAK
1968 CATECHOLAMINE IM GEHIRN DER EIDECHSE (LACERTA VIRIDIS UND LACERTA MURALIS)
Z ZELLFORSCH 86(4):574-602, 12 FIG.

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BECAK,M.L. (SEE BECW -967ESC: 151)
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1968 KARYOTYPES, SEX CHROMOSOMES, AND CHROMOSOMAL EVOLUTION IN SNAKES, P. 53-95, 24 FIG., 4 TBLS., IN W.BUECHERL, E.E.BUCKLEY AND V.DEULOFEU (EDS.) VENOMOUS ANIMALS AND THEIR VENOMS. ACADEMIC PRESS, NEW YORK.
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BERCHTOLD,JEAN-PIERRE
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COMP REND ACAD SCI (PARIS) D 266(2):156-158, 4 FIG.
BERGER,ARIEH (SEE ALOS -968DLF: 53)
BERTRAM,COLIN AND KATE BERTRAM
1968 THE WORLD'S MOST VALUABLE REPTILES
ANIMALS 10(10):440-443, ILL. (SOME COLOR)
BERTRAM,KATE (SEE BERC -968WMV: 440)
BETZ,T.W.
1967 THE OVARIAN CYCLE OF NATRIX RHOMBIFERA - AN APPARENTLY GENERALIZED CYCLE OF SNAKES OF TEMPERATE LATITUDES
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BICHER,H.I.
1968 SPECIFIC SITES OF ACTION OF SNAKE VENOMS IN THE CENTRAL NERVOUS SYSTEM
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BILLAUD,G. (SEE GASJP-967PPS: 18)
BILLINGS,THOMAS A. (SEE KOCWF-968ERA: 165)
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1968 CHROMOSOME NUMBER DIFFERENCE IN THE AMPHIBIAN GENUS BUFO: THE BUFO REGULARIS SPECIES GROUP
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BOQUET,P.
1968 CHEMISTRY AND BIOCHEMISTRY OF THE SNAKE VENOMS OF EUROPE AND THE MEDITERRANEAN REGIONS, P. 327-338, 2 TBLS., IN W.BUECHERL, E.E.BUCKLEY AND V.DEULOFEU (EDS.) VENOMOUS ANIMALS AND THEIR VENOMS. ACADEMIC PRESS, NEW YORK.
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BORRERO,LUIS M. (SEE ALJEF-968EFA: 289)
BOSCHWITZ,DVORAH
1967 ON THE PROBLEM OF SEASONAL CHANGES IN ANURAN PARATHYROIDS: OBSERVATIONS ON BUFO VIRIDIS IN ISRAEL
ISRAEL J ZOOL 16(1):46-48.
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BRAAK,H.
1968 ZUR ULTRASTRUKTUR DES ORGANON VASCULOSUM HYPOTHALAMI DER SMARAGDEIDECHSE (LACERTA VIRIDIS)
Z ZELLFORCH 84(3):285-303, 8 FIG.
BRAAK,H. (SEE BAUHG-968CGE: 574)
BRACHET,JEAN (ED.) (SEE ABEM -967AM : 1)
BRADLEY,W.GLEN (SEE KAYFR-968ODE: 72)
BRAME,ARDEN H.,JR.
1967 A LIST OF THE WORLD'S RECENT AND FOSSIL SALAMANDERS
HERPETON 2(1):1-26.
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BRANT,PAUL,JR. (SEE GRENB-968ELW: 297)
BRATTSTROM,BAYARD H.
1968 THERMAL ACCLIMATION IN ANURAN AMPHIBIANS AS A FUNCTION OF LATITUDE AND ALTITUDE
COMP BIOCHEM PHYSIOL 24(1):93-111, 10 FIG., 4 TBLS.
BRIDGEN,E.E.
1968 ONE OF NATURE'S CURIOSITIES
VICTORIA NAT (B.C.) 24(6):78.
BRIGGS,JEFFREY L. (SEE PANE -968RCN: 21)
BRIGGS,ROBERT AND J.T.JUSTUS
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BROADLEY,DONALD G.
1968 THE VENOMOUS SNAKES OF CENTRAL AND SOUTH AFRICA, P. 403-435, 20 FIG., IN W.BUECHERL, E.E.BUCKLEY AND V.DEULOFEU (EDS.) VENOMOUS ANIMALS AND THEIR VENOMS. ACADEMIC PRESS, NEW YORK.
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1967 MIOCENE - PLIOCENE PROBLEMS OF PENINSULAR FLORIDA. 13TH FIELD TRIP SOUTHEASTERN GEOL. SOC., TALLAHASSEE. (MIMIO)
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SWANEWS 1968(2):8-9. (ABSTR)
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COMP BIOCHEM PHYSIOL 24(1):47-54, 4 FIG., 1 TBL.

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BREVIORA (280):1-28, 2 FIG.

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COPEIA 1968(1):76-88, 5 FIG., 1 TAB.

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EXPERIENTIA 24(1):79-80, 3 FIG.

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WILDL N CAROLINA 32(2):24, 1 FIG.
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PANDA NIEUWS 4(2):
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PANDA NIEWUWS 4(4):1-3, 3 FIG.

SPINAR,ZDENEK V.
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VESTNIK USTREDNIHO USTAVU GEOL 42(5):375-379, 1 FIG.

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J EXP ZOOL 167(1):49-77, 9 FIG., 7 TAB.

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1968 EINE INTERESSANTE ZEICHNUNGSUND FAERBUNGSVARIANTE BEI PYTHON RETICULATUS (SCHNEIDER) 1801
AQUA TERRA 5(2):15-16, 2 FIG.
1968 ENDLICH SIND IN DER SCHWEIZ DIE REPTILIEN UND AMPHIBIEN GESCHUETZT
AQUA TERR 5(1):6-8, 1 FIG.
STENSAAS,LARRY J. AND SUZANNE S.STENSAAS
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Z ZELLFORSCH MICROSCOP ANAT 84:473-489, 7 FIG.
STENSAAS,SUZANNE S. (SEE STELJ-968LM : 473)
STEPHAN,H. (SEE HASR -967EF : 1)
STEPHENSON,ELSIE M. (SEE ROBES-967KSC: 200)
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VEST ZOOL 1968(1):3-13, 5 FIG. (RUSS. ENG. SUMM)
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PROC SOC EXP BIOL MED 127(1):4-7, 2 FIG., 2 TBLS.
SUZUKI,T.
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MEM INST BUTANTAN 33(2):519-522.
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MEM INST BUTANTAN 33(2):389-410, 22 FIG., 13 TAB.
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INDIAN J EXP BIOL 5(4):259-260.

T

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1968 THE STIMULATING ACTION OF TRIIODOTHYRONINE ON THE ISOLATED SKELETAL MUSCLE OF THE FROG
REV ROUMAINE ENDOCRINOL 5(1):15-19, 2 FIG.
TENTORI,LEONARDO (SEE BRUM -968EKR: 519)
TERRES,JOHN K.
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AUK 85(1):140.
THEILENGERDES,AARON AND DON C.GREEN
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SWANEWS 1968(2):9. (ABSTR)
THIER,SAMUEL O.
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BIOCHIM BIOPHYS ACTA 150(2):253-262, 3 FIG., 4 TBLS.
THOMAS,CHRISTIAN
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ARCH BIOL (LIEGE) 78(3):347-369, 42 FIG. (ENG SUMM)
THOMAS,J.D. (SEE FISJH-968DTA: 1)
THOMAS,RICHARD
1968 NOTES ON ANTILLEAN GECKOS (SPHAERODACTYLUS)
HERPETOLOGICA 24(1):46-60, 4 FIG.
THORN,R. (SEE VILV -968HLM:1222)
TINBERGEN,N. (SEE ENNEA-967T : 1)
TINKLE,DONALD W. (SEE BALRE-968NSU: 1)
TOOM,PAUL M. (SEE TUAT -968HPC: 201)
TRETHEWIE,E.R. AND P.RAWLINSON
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MEM INST BUTANTAN 33(1):235-240, 5 FIG., 1 TAB.
TRIMARCHI,F. AND C.RAPUZZI
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AQUA TERR 5(1):4-6, 1 FIG.
TSCHOERTNER,ULRICH
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AQUA TERR Z 21(2):55-56, ILL.
TU,ANTHONY T. AND BRYANT L.ADAMS
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NATURE 217(5130):760-762, 3 FIG.
TU,ANTHONY T. AND SOMSRI GANTHAVORN
1968 COMPARISON OF NAJA NAJA SIAMENSIS AND NAJA NAJA ATRA VENOMS
TOXICON 5(3):207-211, 4 FIG., 1 TBL.
TU,ANTHONY T. AND PAUL M.TOOM
1968 HYDROLYSIS OF PEPTIDES BY CROTALIDAE AND VIPERIDAE VENOMS
TOXICON 5(3):201-205, 1 FIG., 2 TBLS.
TUZET,O. AND L.PH.KNOEPFFLER
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COMP REND SOC BIOL (PARIS) 161(6):1222-1227, 8 FIG.
VINEGAR,ALLEN
1968 BROODING OF THE EASTERN GLASS LIZARD, OPHISAURUS VENTRALIS
BULL SO CALIF ACAD SCI 67(1):65-68, 3 FIG.
AUTHOR CORRECTION
VIVALDI,GEROLAMO (SEE BRUM -968EKR: 519)
VLADESCU,C.
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REV ROUMAINE ENDOCRINOL 5(1):25-34, 1 FIG. (ENG SUMM)
VLADESCU,C. AND MARGARETA BALTAC
1967 INVESTIGATIONS ON GLYCOREGULATION IN HOUSE-SNAKE (NATRIX NATRIX L.)
REV ROUM BIOL ZOOL 12(1):61-66, 4 FIG., 1 TBL. (ENG.)
VOLPE,E.PETER AND SHERILL CURTIS
1968 GERM CELL CHIMERISM: ABSENCE IN PARABIOTIC FROGS
SCIENCE 160(3825):328-329, 1 FIG.
VOLPE,E.P. (SEE COWRR-968HAS: 196)
VOUTE,CORNELIS L. AND HANS H.USSING
1968 SOME MORPHOLOGICAL ASPECTS OF ACTIVE SODIUM TRANSPORT, THE EPITHELIUM OF THE FROG SKIN
J CELL BIOL 36(3):625-638, 9 FIG., 2 TABLES
VRIES,ANDRE DE (SEE ALOS -968DLF: 53)
VRIES,A.DE (SEE GITS -968SPT: 359)
VRIES,A.DE (SEE KLIC -968EAS: 15)
VRIES,J.DE (SEE GOOHJ-968EP : 384)
VRIES,TJITTE DE
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INT TURTLE TORTOISE SOC J 2(2):16, 18-19, 33, ILL.

W

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COPEIA 1968(1):164-167, 1 FIG.
WALLACE,R.A. (SEE RUDD -968SPS: 299)
WALTER,RODERICH (SEE EGGP -968RBH: 59)
WARING,H. (SEE SHOVH-968EHL: 47)
WARREN,JAMES W. AND UWE PROSKE
1968 INFRARED RECEPTORS IN THE FACIAL PITS OF THE AUSTRALIAN PYTHON MORELIA SPILOTES
SCIENCE 159(3813):439-441, 2 FIG.
WATKINS,J.F. (SEE GEHFR-968BSL: 10)
WATLINGTON,CHARLES O.
1968 EFFECT OF ADRENERGIC STIMULATION ON ION TRANSPORT ACROSS SKIN OF LIVING FROGS
COMP BIOCHEM PHYSIOL 24(3):965-974, 3 FIG., 1 TAB.
WELSH,J.H.
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MEM INST BUTANTAN 33(2):509-518, 3 FIG., 2 TAB.
WERNER,LOTHAR
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AQUAR TERR 15(1):18-23, ILL.
WIESER,WOLFGANG AND ELISABETH NOPP-PAMMER
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COMP BIOCHEM PHYSIOL 24(3):1015-1025, 4 FIG.
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EVOLUTION 22(1):76-86, 2 FIG., 3 TBLS.

WIMBERLY,NEIL (SEE LINRH-967ETA: 416)

WINK,URSULA AND HERMANN WURMBACH
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ZOOL JB ABT ALLG ZOOL PHYSIOL TIERE 73(4):343-374, 31 FIG., 1 TAB.

WITKOP,B. (SEE DALJW-968VA : 425)

WOODS,JOHN E. AND DAVID B.WAKE
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COPEIA 1968(1):128-138, 5 FIG., 1 TAB.

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WRIGHT,JOHN W. (SEE COLCJ-968KES: 96)

WRIGHT,ROBERT H.
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WYMAN,JEFFRIES (SEE BRUM -968EKR: 519)

-----Y-----

YAMANA,K. (SEE SHIK -967SRI:1027)

YASUDA,MASARU (SEE YASG -968FSD: 18)

YASUZUMI,GONPACHIRO AND MASARU YASUDA
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Z ZELLFORSCH 85:18-33, 12 FIG.

-----Z-----

ZACHERY,JOEL
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TENNESSEE CONSERV 34(4):13-14, 1 FIG.

ZANGERL,RAINER (SEE GAFES-968RCG: 193)

ZAPPALORTI,ROBERT
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INT TURTLE TORTOISE SOC J 2(1):35-39, ILL.

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AQUARIEN MAG 1968(3):102, 1 FIG.

ZELLER,E.A.
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MEM INST BUTANTAN 33(2):349-358, 3 FIG.

ZHIRMUNSKY,A.V. AND I.M.PASHKOVA
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MEM INST BUTANTAN 33(1):281-291, 13 FIG.

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BULL ZOOL NOMENC 24(6):328.

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The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles. Regular dues are $4.00 worldwide and should be remitted (preferably via international money order outside the U. S. A. and Canada) to the Secretary-Treasurer. Members are invited to subscribe to the higher categories of Sustaining ($5.00), Contributing ($15.00), or Life ($100, in four payments of $25.00) membership. Institutional subscription is $6.00. A complete list of publications of The Ohio Herpetological Society and the Society for the Study of Amphibians and Reptiles is available from the Publications Secretary.

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NEXT SOCIETY MEETING: See page 5.

Herpetological Review

number 2 *** april 1968

•CONTENTS

Page

3 Last Year's SSAR Meeting in Columbus, Ohio: Resume and Photographs

3,5 Society Announcements: Dues, Changes in Officers

5 This Summer's SSAR Meeting at Mountain Lake, Virginia: Description and Photographs

6 Other Society Meetings: ASIH, AIBS, Virginia Herpetologists

6 Biological Stations: Herpetology Courses Offered at Mountain Lake, Oklahoma, West Virginia

6 Plea to Conserve the Texas Blind Salamander (Typhlomolge rathbuni) at Ezell's Cave in Texas

6 New Books and Reprints

9 Current Herpetological Titles: 1967, by H. G. Dowling, Itzchak Gilboa, and Irene Palser

■■■■

LAST YEAR'S SSAR MEETING.

The Society's tenth anniversary meeting was held on the campus of The Ohio State University in Columbus, 8-10 September 1967; it was sponsored jointly by the University, the Ohio State Museum, and the Columbus Zoological Gardens. In a letter of welcome addressed to former Society Chairman James C. List, the Honorable James A. Rhodes, Governor of Ohio, recalled the Society's founding in Columbus in 1958: "We Ohioans are most proud of our role in the establishment and perpetuation of the Society, and are aware of the appropriateness of its return to Ohio for the tenth anniversary meeting. . ."

A symposium, "The Biology of Salamanders," organized and moderated by Robert E. Gordon, was held on Saturday, September 9th. Participants were Victor H. Hutchison, Denzel E. Ferguson, Stanley N. Salthe, James A. Organ, Arden H. Brame, Jr., Joseph A. Tihen, Barry D. Valentine, and David B. Wake. An informal party was held in the evening at the home of Barry and Buena Valentine; Sherman Minton, Stephen Tilley, David Dennis, Glenn Gentry, and others each showed series of herpetological slides from their travels.

Members were treated to a tour of the Columbus Zoo's new reptile and amphibian house early Sunday morning, hosted by Curator Louis Pistoia. Contributed papers occupied the rest of the day in sessions presided over by Arnold G. Kluge and Ronald A. Brandon. Abstracts of all papers, including those in the symposium, appeared in the Journal of Herpetology (vol. 1, pp. 109-121, 1968). A total of 116 persons attended the meeting.

The Society wishes to record its gratitude to the authorities of the host institutions and to the many individuals who helped make the meeting a success. First, to Robert E. Gordon for organizing and moderating the symposium with his characteristic skill and wit, and to the symposium participants for their valuable papers and discussions. To the members of the local committee, Barry D. Valentine and John M. Condit, co-chairmen; Norton M. Rubenstein and David H. Stansbery, for excellent arrangements and facilities. To Stephen G. Tilley who organized a successful photographic display and to Kraig Adler who planned the program. Finally to those Friends of the Society who contributed financially to the support of the symposium. [see photographs on page 4]

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1968 DUES.

If your 1968 dues have not yet been paid, a special form in enclosed for that purpose. The first issue of volume 2 and part 6 of the Boulenger series will be mailed in late May; these cannot be sent to individuals whose dues are in arrears.

NEW OFFICERS.

All Society officers nominated for the 1968-1969 term were elected; a list may be found on page 2 of this issue.







1967 MEETING SCENES. (left) Sunday Contributed Paper Session: Moderator Arnold Kluge, Speaker James Huheey. (center) Saturday Noon Banquet, Symposium Speakers (left to right): Denzel Ferguson, James Organ, David Wake, Barry Valentine, Society Chairman James List, Robert Gordon, Stanley Salthe, Victor Hutchison. Foreground: Gerry and Lowell Orr. (right) Coffee Break (left to right): Ronald Brandon, George Rabb, Carl Gans, Norton Rubenstein, James List (back to camera).



1967 MEETING GROUP PHOTOGRAPH. Left to right, ROW 1: David Dennis, James List, Ronald Brandon, Corson Hirschfeld, Floyd Downs, Richard Montanucci, Barry Valentine, Norris Denman, J. P. Kennedy, Gordon Thurow, Max Hensley, Henri Seibert, Joseph Tihen. ROW 2, Kraig Adler, John Cooper, Richard Worthington, Pat Worthington, Enoch Albert, James Huheey, Caroline Lusby, Sherman Minton, Madge Minton, William Posey, Mrs. Albert Reynolds, Albert Reynolds, David Ruffer, Joseph Collins. ROW 3, Clarence McCoy, Diane Secoy, William Byrd, Denzel Ferguson, John Woods, Victor Hutchison, Stanley Salthe, William Thomas, John Morris, Dolores Adler, Jane Collins. ROW 4, Arnold Kluge, Stevan Arnold, Henry Wilbur, Chris Stotler, Mrs. Chris Stotler, Arden Brame, David Grant, Edward Thomas, Patricia Zug, George Zug, James MacMahon. ROW 5, Mrs. Norris Denman, Curtis Allen, Mrs. Curtis Allen, Barbara Maple, Mrs. Lowell Orr, Lowell Orr, Glenn Gentry, C. R. Shoop, James Organ, Della Organ, Robert Gordon, D. H. Taylor. ROW 6, Linda Dennis, Margaret Stewart, Paul Lemon, William Maple, Lloyd Fitzpatrick, Gordon Forster, David Hardy, Janet Olmon, Ronald Lawson, David Wake, Howard Hintz, James Spotila. ROW 7, R. Martin, H. J. DeJongh, Carl Gans, James Fowler, Jr., Martin Cooper, Marvin Bobes, Steve Wood, Claire Zurbuch, Richard Franz, Norton Rubenstein, Diane Lange, Mary Tilley, Steve Tilley, George Rabb, William Hinchey. ROW 8, Rick Sinclair (top of head), Ralph Sinclair, James Fowler, Sr., Daniel Wonderly, Mark Fraker, Harry Jopson, Stephen Bass, Katherine Miller, Bruce McLean. Not Shown: James Vial, Bayard and Mrs. Green, John Condit, Charles Chantell, Eugene Schroeder, Louis Pistoia, Robert and Susan Kondik, Paul Daniel, Benjamin Banta, Mrs. Norton Rubenstein, Mrs. Ronald Lawson, Jerry Hardy, Sheldon Guttman, Anne Fraker, Mrs. John E. Cooper, D. Bonnett, Ray E. Ashton, Jr. Total, 116 persons.

OFFICERS RETIRE.

The Society wishes to thank three officers whose terms expired last December 31st, for their dedication and service. First, to James C. List who served as Chairman during 1966 and 1967, a particularly critical period in the Society's history during which name changes and restructuring of the organization was accomplished; Dr. List has been appointed Assistant Publications Secretary for the current term. Second, our thanks to Corson Jay Hirschfeld who served the Society in a variety of important capacities including Chairman (1962-1965) and more recently as Editor (1965-1967). He was instrumental in improving format and increasing the size of the Journal and in enlarging the newsletter into Herpetological Review. Last, we thank John M. Condit who has served well as Index Editor.

next SSAR meeting: august 1968

THIS SUMMER'S SSAR MEETING.

The Society will hold its eleventh annual meeting August 23-25, 1968, at the University of Virginia's Mountain Lake Biological Station, located in southwestern Virginia near the West Virginia border. The summer session will have ended by meeting-time and all Station facilities will be made available to the Society. Paper sessions will be held in the auditorium of the main laboratory building (see photo); meals will be provided in the Station's dining hall and sleeping accomodations in various cabins and dormitories. The Station is situated at an elevation of 4000 feet in the Jefferson National Forest; the mountains in this area are part of the Allegheny system and the Station itself rests directly on the Atlantic-Gulf watershed divide. Whitetop Mountain and Mt. Rogers (highest point in Virginia, 5720 ft.) are only 125 miles away by road; Grandfather Mountain, North Carolina, 175 miles; and the Great Smoky Mountains, 250 miles.

Preliminary plans are for the Board of Directors to meeting Friday evening, August 23d. The paper sessions are scheduled for Saturday and Sunday mornings, with several invited lectures on Saturday afternoon. There will be a social gathering Saturday evening and local field trips Sunday afternoon. A photographic display and an exhibit of live reptiles and amphibians from the Appalachian region are planned. Photos may be submitted by anyone and are to be sent to Kraig Adler, Museum of Zoology, The University of Michigan, Ann Arbor, Michigan 48104; photos will be returned immediately after the meeting. Be sure to include species and locality information for each photo.

Registration will be limited by the size of the Station's auditorium, which seats 100. The cabins and dining hall will accomodate an equal number, but there are excellent camping facilities nearby and a large hotel two miles from the Station on the south shore of Mountain Lake (see photo). Details on the program, local accomodations, and transportation will be mailed to each member in June. Harry G. M. Jopson of Bridgewater College (Virginia) and James A. Organ of the City University of New York are serving are meeting co-chairman. After June 10th, room reservations and programs may be obtained from Dr. Organ, c/o Mountain Lake Biological Station, Route 1, Pembroke, Virginia 24136.







MOUNTAIN LAKE SCENES. (left) Mountain Lake, looking south to Bald Knob (ele. 4363 ft) and Mountain Lake Hotel; Biological Station 2 mi. NE. Habitat of Natrix, Chelydra, Notophthalmus, Plethodon, Pseudotriton, Eurycea. (center) Main laboratory building; paper sessions to be held in auditorium here. (right) The "Cascades," waterfall on Little Stony Creek, 5 mi. W of Station. Habitat of Gyrinophilus, Eurycea, Natrix, Elaphe, Diadophis, and four species of Desmognathus.

SOCIETY MEETINGS.

American Society of Ichthyologists and Herpetologists: 48th Annual Meeting, Ann Arbor, Michigan, 16 to 20 June. Programs from Donald W. Tinkle, Museum of Zoology, The University of Michigan, Ann Arbor, Michigan 48104.

American Institute of Biological Sciences: Annual Meeting, Columbus, Ohio, 3 to 7 September.

Virginia Herpetological Society: Third Annual Open House, to be held at the Division of Reptiles and Amphibians, U. S. National Museum, Washington, D. C., 18 and 19 May.

HERPETOLOGY COURSES AT BIOLOGICAL STATIONS.

Herpetology courses are being offered this summer at several biological stations. The following three have come to our attention:

Mountain Lake Biological Station, near Blacksburg, Virginia. July 18-August 21; H. G. M. Jopson, instructor. Apply to Director, MLBS, c/o Department of Biology, University of Virginia, Charlottesville, Virginia 22903.

University of Oklahoma Biological Station, near Willis, Oklahoma. C. C. Carpenter, instructor. Apply to UOBS, c/o Department of Zoology, University of Oklahoma, Norman, Oklahoma.

"Tierra Alta," West Virginia Biological Station. June 17-July 19; J. P. Kennedy, instructor. Apply to Dr. Jay Barton, Department of Biology, West Virginia University, Morgantown, West Virginia.

PLEA TO CONSERVE THE TEXAS BLIND SALAMANDER AT EZELL'S CAVE, TEXAS.

The Texas Chapter of the Nature Conservancy has succeeded in purchasing Ezell's Cave near San Marcos, Texas, a locality for the subterranean Texas Blind Salamander, Typhlomolge rathbuni; the cave also hosts a wide variety of other equally bizarre species of animals. The Texas Chapter must repay the land-purchase loan made to it by the national organization, as well as erect a fence and a cabin for a caretaker; this totals nearly $16,000. Donations of any amount are solicited. Checks may be made payable to the Nature Conservancy and sent to: The Nature Conservancy, Texas Chapter, 909 Reliance Life Building, Dallas, Texas 75201. All contributions are deductable for income tax purposes.

This purchase is heartening news, for the cave's fauna had been threatened recently by commercialization. The Society strongly recommends support of this most worthy cause.

New Books & Reprints

Amphibiens Urodèles de la Chine, by M. L. Y. Chang. 1936 (reprint May 1968). 165 pages. The introduction by Arden H. Brame, Jr., includes a new, up-to-date checklist of Chinese salamanders. The following prices apply before publication only:
Members: $3.00 paperbound; $5.00 clothbound.
Institutions: $6.00 paperbound; $10.00 clothbound.
★ Place advance orders at once to take advantage of these temporarily lowered rates. Send orders to the Publications Secretary, SSAR: Henri C. Seibert, Department of Zoology, Ohio University, Athens, Ohio 45701. A special order form is enclosed.

The Life and Demography of the Side-Blotched Lizard, Uta stansburiana, by Donald W. Tinkle. 1967. Misc. Publ. no. 132, 182 pages. Univ. Michigan Mus. Zool., Ann Arbor. $3.75 paperbound; $4.75 clothbound.

The Caecilians of the World: A Taxonomic Review, by Edward H. Taylor. 1968 (to appear shortly). Univ. Kansas Press, Lawrence. About 900 pages. $20.00.

Lizard Ecology, a Symposium, edited by W. W. Milstead. 1967. Univ. Missouri Press, Columbia. 300 pages, $7.50 clothbound. Contributors: W. F. Blair, B. H. Brattstrom, C. C. Carpenter, W. R. Dawson, L. T. Evans, H. S. Fitch, J. E. Heath, H. Heatwole, W. W. Mayhew, W. W. Milstead, K. S. Norris, A. S. Rand, R. Ruibal, D. W. Tinkle, and V. A. Tucker.

The Hyoid and Its Associated Muscles in Snakes, by David A. Langebartel. 1968. Illinois Biol. Monogr. (Univ. Illinois Press, Urbana), no. 38, 156 pages. $4.95 paperbound.

Intrageneric Relationships Among Colubrid Snakes of the Genus Geophis Wagler, by Floyd L. Downs. 1967. Misc. Publ. no. 131, 193 pages. Univ. Michigan Mus. Zool., Ann Arbor. $3.00 paperbound.

Batrachia and Reptilia of Costa Rica, by Edward D. Cope. 1875 (reprint 1967). Extract from Jour. Acad. Nat. Sci. Philad., 70 pages. Available from: J. D. Villa, Departamento de Biologia, Universidad de Costa Rica, Ciudad Universitaria, "Rodrigo Facio," San Jose, Costa Rica. $2.00 paperbound.

The Caucasus Rocklizards, by I. S. Darevsky. 1967. Academy of Sciences, Leningrad, 214 pages [in Russian]. A detailed review of all parthenogenetic Lacerta and related species.

Classification der Batrachier, by J. J. von Tschudi, 1838 (reprint 1967). 120 pages. $4.00 paperbound; $6.00 clothbound. Send orders to the Publications Secretary, SSAR: Henri C. Seibert, Department of Zoology, Ohio University, Athens, Ohio 45701; a special order form is enclosed.

Living Turtles of the World, by P. C. H. Pritchard. 1968. New York, 288 pages; 155 color photos. $9.95 clothbound.

Elementary Probability for the Biological Sciences, by James E. Mosimann. 1968. 264 pages. Appleton-Century Crofts, New York. $1.95 paperbound.

Directory of Bioscience Departments in the United States and Canada. Publ. of Office of Biological Education, American Institute of Biological Sciences. Complete information on programs and staffs of 1,846 bioscience departments in 1,112 colleges and universities, plus 300 non-degree granting institutions; about 25,000 names of administrative and teaching faculty are listed. 1967. Address requests for Directory to Mr. Richard J. Burk, Jr., Assistant to the Director, AIBS Office of Biological Education, 3900 Wisconsin Avenue, NW, Washington 20016.

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MICROFICHE. Microfacsimiles of books on transparent sheets of safety film, size 9 x 12 cm, each card containing 40-70 pages of text. Catalogue available from Inter Documentation Co. AG, Poststrasse 9, Zug, Switzerland. Some herpetological titles are listed below:

Baur, G. 1888. Beitrage zur Morphologie des Carpus und Tarsus der Vertebraten. I. Amphibien. 86 p., 3 pls. $1.80

Gray, J. E. 1828. Spicilegia Zoologica. 12p. $1.90

Seba, A. 1734-1765. Locupeltissimi rerum naturalium thesauri accurata descriptio et iconibus. . . 4 vols., no price listed.

Tschudi, J. J. 1844-1846. Untersuchungen uber die Fauna Peruana. 3 vols. [incl. herpetological section] $13.90

Cocteau, J. T. & G. Bibron. 1841-1843. Reptiles [In de la Sagra, Historia fisica, politica y natural de la isla de Cuba]. $3.40

Duméril, A. M. C. and G. Bibron. 1834-1854. Erpétologie générale. .des reptiles. 10 vols. $6.40

Ecker, A. 1864-1882. Anatomie des Frosches. $4.20

Fayrer, J. 1872. Thanatophidia of India. 156p. $7.40

Gunther, A. 1864. Reptiles of British India. $8.90

Guichenot, A. 1850. Histoire naturelle des reptiles et poissons. . de l'Algerie. $3.10

Haller, A. v. 1758. Historia Naturalis Ranarum. 115p. $7.80

Holbrook, J. E. 1842. North American Herpetology. 5 vols. $14.40

Laurenti, J. N. 1768. Specimen medicum exhibens synopsin reptilium. 214p. $2.90

Mason, J. J. 1879-1882. Minute structure of the central nervous system of certain reptiles and batrachians of America. Newport, 40p. $2.60

Peters, W. 1882. Naturwissenschaftliche Reise nach Mossambique. . III. Amphibien. 200p. $4.90

Roesel von Rosenhof, A. J. 1758. Historia naturalis Ranarum nostratium. 120p. $6.20

Schinz, H. Naturgeschichte und Abbildungen der Reptilien. 1833-1835. 240p. $2.10

Schlegel, H. 1837-1844. Abbildungen neuer oder unvollstandig bekannter Amphibien. $2.90

Schreiber, E. 1875. Herpetologia Europaea. $6.40

The section which follows is a new addition to this newsletter. In the past, the Society has published lists of recent literature in its newsletter, recognizing the problem caused by the several years delay in publication of Zoological Record and the incompleteness of Biological Abstracts. This attempt never pretended to be comprehensive. The computerized lists which begin in this issue should provide current listings of most of the herpetological literature for a given period of time. The Society is indeed pleased that its newsletter has been chosen as the medium for publication of these useful lists.

In the past, extra copies of newsletters have not been printed beyond current needs and thus back-issues were not available. However, the addition of the new literature lists greatly increases the usefulness of the newsletter, at least for a few years after publication of each issue. For this reason, we are planning to print extra copies, hopefully enough to supply workers in the interim before the appearance of Zoological Record. Single issues will cost $1.00 each postpaid and may be obtained from the Publications Secretary (address on page 2). -- Ed.

Current Herpetological Titles: 1967

By H. G. Dowling, Itzchak Gilboa, and Irene Palser

GENERA OF REPTILES, American Museum of Natural History, New York, New York 10024.

* * * *

CURRENT publications in the field of herpetology seem to be in the order of 3,000 accounts annually, including species descriptions, faunal works, checklists, and other reports. This field is almost unique in biology in that few comprehensive works appear. The "information explosion" is our most serious problem, yet there has been no systematic attempt to consolidate herpetological information in this century. While efficiency in research involves at least a general scanning of relevant current literature, this task, with the output doubling about every ten years, becomes more difficult and time-consuming every year.

The following photo-offset reproduction of computer printout from magnetic tape of a partial bibliography of the herpetological literature of 1967 is an example of one aspect of the work being done here to consolidate and make available the total output of herpetological data. The incomplete list contains only those titles obtainable since the inception of the GENERA OF REPTILES project on 1 January 1968 and includes only those published during 1967. The literature search included the journals and books received by the Library and the Department of Herpetology of this Museum, together with reprints sent directly to us up to 31 March 1968. A few titles have been obtained from secondary sources.

Among the purposes of publishing this list is to give herpetologists a better idea of the present scope of the field and to indicate the diverse sources of information on amphibians and reptiles. Another is to demonstrate the broad "gray area" that is occupied by papers that describe the use of amphibians or reptiles in some field of research -- this field often being distant from the usual interests of biologists who work on anatomical, behavioral, systematic, evolutionary, ecological, or (whole-animal) physiological studies.

The major concern of the project is the search for, cross-indexing of, and (where pertinent) the microfilming of important segments of herpetological literature. The ultimate objective of this work is to consolidate this information in a file that allows easy access from systematic, geographic, and subject routes. To accomplish these aims, all included information is placed on IBM punched cards and microfilm aperture cards.

Future: The file on 1967 literature is simply a list of titles, but the literature will be cross-indexed beginning with the 1968 list. This index is primarily for use with the overall Bibliography of Herpetology, and we have not decided whether or not to publish indices with the quarterly lists. The first quarterly list of 1968 literature should be ready for printing in May.

Acknowledgments: This list was prepared with the aid of many persons in the Herpetology Department, the Photography Department, and the Library of the Museum, and with the help of various individuals in the Department of Zoology and the Computer Laboratory of the University of Rhode Island. The project is supported by the National Science Foundation (NSF GN-707). We thank all of these persons and institutions, and especially James E. Bradley, Operations Manager, and Harlan S. Hersey, Programmer, of the URI Computer Laboratory.

On Using The List: The list is arranged, as is customary, alphabetically by author, followed by the date, title, and journal reference. However, the names of junior authors are referred to the proper citations by "See" lines that are in the form of a code. Note, for example, the reference under "Abrams, Gerald D.," that says, "See JOIGN-967 ETL: 942." The "JOIGN" refers to a paper by Joiner, Gary N. (the code is derived from the first three letters of his family name and the initial letters of his [first two] given names), and Abrams. The "967" is the year of publication, minus the initial "1", and the following "ETL" is derived from the initial letters of the first three significant words of the title (or subtitle, if the paper is one of a series). The number "942" after the colon is the initial page number of the article.

Although the coding may at first appear cumbersome, it is actually a brief and explicit reference to a publication. In spite of some authors publishing more than one paper with the same title in a given year, the code so far has allowed us to allocate the information to the proper citation.

A REQUEST TO THE READER

We would appreciate your critical comments on this first effort, in the hope that subsequent works will be improved thereby. We would like to know if you find such a list of current titles helpful, how much time you spent reading it, how many papers of interest it brought to your attention, what you think about coverage, timeliness, format, and other aspects of its makeup.

We would like to know if you note the absence of any pertinent journals in your field, if any journals noted here are brought to your attention for the first time, and whether or not such journals are available in your library.

We would like to hear from you on your feelings about the practicability of a "HERPETOLOGICAL INFORMATION CENTER," what benefit you would hope to derive from it, what it would be worth to you, any ideas you might have on financing such a service. In other words - we will appreciate any comments that pertain to this work that we have begun.

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ANON
1967 SHORT-NECKED TORTOISE DISCOVERIES
ORYX 9(2):77-78.
ANON
1967 CLASS REPTILIA. IN LIST OF THE ANIMALS EXHIBITED IN THE GARDENS DURING THE YEAR ENDED 30TH JUNE, 1967.
ANN REPT ROYAL ZOOL SOC SOUTH AUSTRALIA INC. 89:9, PHOTO ON COVER
ANON
1967 FLATBACK TURTLE
AUST NAT HIST 15(11):342, 1 FIG.
ANON
1967 STATUS, THE PRESENT STATE OF THE INVESTIGATION AND PROTECTION OF MAMMALS, REPTILES AND AMPHIBIA IN THE NETHERLANDS DURING 1964. IN 10 JAREN RIVON, STATE INST NAT CONSERV RES
ANON
1967 WASHINGTON WILDLIFE
GAME BULL WASHINGTON DEPT GAME 19(4):14, 2 FIG.
ANON
1967 VACATION YIELDS RARE RATTLESNAKE
AMER FIRST ZOO 19(4):26, 2 FIG.
ANON
1967 STAR TORTOISE, TESTUDO ELEGANS
ZOONOOZ 40(5):1ST COVER (COL. PHOTO)
ANON
1967 (NATURE NOTE) UTA STANSBURIANA, SIDE-BLOTCHED LIZARD
SCI NEWS 92(22):508, 1 FIG.
ANON
1967 VERSLAGEN VAN DE MAANDVERGADERINGEN TE MAASTRICHT OP DONDERDAG 5 OKTOBER 1967
NAT HIST MAANDBLAD 56(10):149-151, 2 FIG.
ANON
1967 CHECKLIST OF AMPHIBIANS AND REPTILES OF BIG BEND NATIONAL PARK
(MIMIO) 2 P.
ANON
1967 A RARE FROG FROM SOUTHERN THAILAND
ASRCT NEWSLETTER 5:3-4, ILL.
ANON
1967 THE SOUTH AFRICAN PYTHON IS DISAPPEARING
PRIRODA 1967(4):77. (BULGARIAN)
ANON
1967 VEDJUEK MEG A KIPUSZTULASTOL A TOEREKENY GYIKOT (ANGUIS FRAGILIS)
BUVAR 12(4):251, 1 FIG. (HUNG)
ANON
1967 BELLE VUE ALLIGATORS
AQUARIST 32(7):171.
ANON
1967 CABLES BEND FOR TORTOISES
KINGFISHER 3(3):13.
ANON
1967 SOUTH ARABIA: GREEN TURTLE STUDY
IUCN BULL 2(4):29.
ANON
1967 MALE LIZARDS UNNEEDED
SCI NEWS 92(27):533.
ANON
1967 REMOVALS
SPOTS AND STRIPES 4(2):4.
ANON
1967 GREEN TURTLES IN ARABIA
ORYX 9(3):177.
ANON
1967 ISLANDS THAT INSPIRED DARWIN
ILL LONDON NEWS 1967 NOV 18:32-33, ILL., COL. COVER.
ANON
1967 NO CROCODILES FROM INDIA
ORYX 9(3):184.
ANON
1967 RARE ANIMALS BILL FOR THE USA
ORYX 9(3):172.
ANON
1967 A REVIEW OF THE EVERGLADES PROBLEM
IUCN BULL 2(5):35, 40.
ANON
1967 TURTLE HATCHERIES IN MALAYSIA
ORYX 9(3):188.
ANON
1967 TURTLES AND SEALS IN TURKEY
ORYX 9(3):176-177.
ABALOS,J.W.
1967 THE CORALINE FROG: A VENOMOUS AMPHIBIAN OF THE SOUTHERN CHACO
TORTOX NEWS 45(1):34-35, ILL.
ABRAHAMSON,YVETTE AND MICHAEL MAHER
1967 THE EFFECTS OF TEMPERATURE UPON PANCREATIC AMYLASE IN SELECTED REPTILES AND AN AMPHIBIAN
CAN J ZOOL 45(2):227-232.
ABRAMS,GERALD D. (SEE JOIGN-967ETL: 942)
ABRAMS,ROBERT M. (SEE HAMHT-967RBT:1260)
ACHER,R., J.CHAUVET, M.T.CHAUVET AND D.CREPY
1967 LES HORMONES NEUROHYPOPHYSAIRES DES AMPHIBIENS. ISOLEMENT ET CARACTERISATION DE LA MESOTOCINE ET DE LA VASOTOCINE CHEZ LE CRAPAUD (BUFO BUFO).
GEN COMP ENDOCRINOL 8(2):337-343.
ACHER,ROGER (SEE CHAJ -967HAS:2084)
ADAMS,N.G.K.
1967 BUFO MARINUS EATEN BY RATTUS RATTUS
NORTH QUEENSLAND NAT 34(143):5.
ADAMSON,R.H.
1967 DRUG METABOLISM IN MARINE VERTEBRATES
FEDER PROC 26(4):1047-1055.
ADOLPH,E.F.
1967 ONTOGENY OF VOLUME REGULATIONS IN EMBRYONIC EXTRACELLULAR FLUIDS
QUART REV BIOL 42(1):1-39, ILL.
AGRAWAL,VINOD
1967 SOME NEW CAMALLANOIDEA (SPIRURIDA) NEMATODES FROM FISHES, AMPHIBIANS AND REPTILES
ANN PARASIT 42(3):327-342, 21 FIG.
AGRAWAL,VINOD (SEE GUPSP-967NTH: 77)
AIYAWAR,RAMA M. (SEE CAMJP-967EFS: 213)
AIYAWAR,RAMA M. (SEE FRIRT-967ENA: 847)
AKAIKE,N. (SEE SATM -967MPF: 39)
AKCASU,ALAEDDIN AND B.SALAFSKY
1967 MIGRATION OF SODIUM ION ALONG STIMULATED FROG SCIATIC NERVE
EXP NEUROL 18(1):49-55, ILL.
ALBARRACIN,C. (SEE BARFD-967AGA: 799)
ALBRECHT,PHILIP W.
1967 THE CRANIAL ARTERIES AND CRANIAL ARTERIAL FORAMINA OF THE TURTLE GENERA CHRYSEMYS, STERNOTHERUS, AND TRIONYX: A COMPARATIVE STUDY WITH ANALYSIS OF POSSIBLE EVOLUTIONARY IMPLICATIONS.
TULANE STUD ZOOL 14(3):81-99, 3 FIG.
ALCALA,ANGEL C. (SEE BROWC-967NFG: 65)
ALEXANDER,K.M.
1967 COMPARATIVE STUDY OF THE TOTAL AMINO ACIDS IN SKELETAL MUSCLE OF SOME REPRESENTATIVE VERTEBRATES
SCI CULTURE 33(6):294-296.
ALLEN,DURWARD LEON
1967 THE LIFE OF PRAIRIES AND PLAINS.
MCGRAW-HILL BOOK CO., NEW YORK. 1-232, ILL.
ALLIN,ROGER W.
1967 INADEQUATE WATER SUPPLY THREATENS EVERGLADES NATIONAL PARK
PARKS AND REC 2(10):37, 51-54, 2 FIG.
ALLISON,TERRY C. AND J.LEON MCGRAW
1967 THE HELMINTH PARASITES OF CENTRARCHIDAE FROM THE NAVASOTA RIVER SYSTEM OF TEXAS
TEXAS J SCI 19(3):326-328.
ALLTUCKER,D.S. (SEE GUAT -967PRS: 513)
ALONSO,D.
1967 ENERGY SOURCES FOR GASTRIC SECRETION: SUBSTRATES
AMER J PHYSIOL 212(5):992-1000.
ALTIG,RONALD
1967 FOOD OF SIREN INTERMEDIA NETTINGI IN A SPRING-FED SWAMP IN SOUTHERN ILLINOIS
AMER MIDLAND NAT 77(1):239-241.
ALTIG,RONALD G. (SEE BROED-967MVJ: 670)
ALTMANN,G. (SEE TOMS -967NSS: 137)
ALVARADO,RONALD H.
1967 THE SIGNIFICANCE OF GROUPING IN WATER CONSERVATION IN AMBYSTOMA
COPEIA 1967(3):667-668.
AMADON,DEAN
1967 GALAPAGOS FINCHES GROOMING MARINE IGUANAS
CONDOR 69(3):311.
AMALIA,BOSIA (SEE AREP -967SED: 138)
AMARO,A. AND S.SENA
1967 "ZELLERIELLA NUCLEOLATA" SP. N., ENTEROZOARIO DE "LEPTODACTYLUS OCELLATUS" L., DO BRASIL (SARCOMASTIGOPHORA, OPALINATA)
ATAS SOC BIOL RIO DE JANEIRO 11(3):89-90, 5 FIG.
AMORIM,D.S., J.C.MANCO, S.H.FERREIRA, A.TANAKA AND S.S.CARDOSO
1967 HEMODYNAMIC EFFECTS OF BRADYKININ POTENTIATED BY A FACTOR CONTAINED IN THE "BOTHROPS JARARACA" VENOM. COMPARATIVE RESULTS WITH ELEDOISIN
ACTA PHYSIOL LATINO AMER 17(4):258-266, 2 FIG., 2 TBLS
AMOS,WILLIAM HOPKINS
1967 THE LIFE OF THE POND. MCGRAW-HILL, INC., NEW YORK. 232 P., ILL. (SOME COLOR)
AMOUCH,PAUL (SEE FINJM-967EGT:1248)
ANASTASI,A., V.ERSPAMER AND R.ENDEAN
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HUTT,ART
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HUTT,A.P.
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1967 EFFECT OF A DITHIOCARBAMOYLHYDRAZINE DERIVATIVE (ICI 33,828) ON SPAWNING IN THE SKIPPER FROG, RANA CYANOPHLYCTIS SCHNEIDER GEN COMP ENDOCRINOL 8(1):72-74, 1 FIG.
KANIA,HENRY J. (SEE TURFB-967AGI: 27)
KAPLAN,H.M., T.J.ARNHOLT AND J.E.PAYNE
1967 TOXICITY OF LEAD NITRATE SOLUTION FOR FROGS (RANA PIPIENS) LAB ANIMAL CARE 17(2):240-346.
KAPLAN,HAROLD M. AND JOHN MICKUS
1967 ULTRASTRUCTURE OF THE BLOOD CELLS OF NECTURUS M. MACULOSUS TRANS ILL STATE ACAD SCI 60(3):236-243, 17 FIG.
KAPPERS,J.ARIEENS
1967 THE SENSORY INNERVATION OF THE PINEAL ORGAN IN THE LIZARD, LACERTA VIRIDIS, WITH REMARKS ON ITS POSITION IN THE TREND OF PINEAL PHYLOGENETIC STRUCTURAL AND FUNCTIONAL EVOLUTION Z ZELLFORSCH 81(4):581-618, 22 FIG.
KARCZMAR,A.G. (SEE KIMKC-967ANJ: 51)
KARLSON,B.M. (SEE FAUVS-967VAR: 728)
KARNAUKHOV,V.N. AND R.T.FIN
1967 THE HAEMOGLOBIN STRUCTURE OF THE FROG'S ERYTHROCYTE CYTOPLASM CYTOLOGY 9(11):1415-1421, 5 FIG. (RUSS, ENG SUMM)
KARZON,D.T. (SEE CLAHF-967THC: 263)
KASAHARA,MICHIKO (SEE MILMR-967OSC: 37)
KASAHARA,MICHIKO (SEE MILMR-967SCI: 549)
KASBOHM,PETER

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1967 MSH ACTIVITY IN PITUITARIES OF RATS TREATED WITH HYPOTHALAMIC EXTRACTS FROM VARIOUS ANIMALS
GEN COMP ENDOCRINOL 8(2):344-347.

KATO,KOICHI (SEE SAWY -967CRH: 58)

KATSUKI,Y. (SEE TERS -967GPI: 684)

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KATZ,B. AND R.MILEDI
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KAUFFELD,CARL
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KAUFFELD, CARL
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HERP 4 (2):20-21.

KAUFFELD,CARL
1967 SO YOU OWN A BOA
IN ANIMALAND 34(5):4, 2 FIG.

KAUFFELD,CARL
1967 SO YOU OWN A BOA. PART II.
IN ANIMALAND 34(6):4, 1 FIG.

KAWAGUTI, S.
1967 ELECTRON MICROSCOPY ON IRIDOPHORES FROM FISH AND AMPHIBIANS
ZOOL MAG 76 (9):281-287, 8 FIGS.

KAWAMURA,YOSHIHARU (SEE SAWY -967CRH: 58)

KAWATA,HIROSHI (SEE GOTM -967NEA: 30)

KEAST,ALLAN
1967 COLONIZATION BY ANIMALS
AUSTRALIAN NAT HIST 15(12):375-381, 4 FIG.

KEEFE,JAMES F.
1967 UNCOMMON COMMENT ABOUT A COMMON CREATURE
MISSOURI CONSERVATIONIST 28(10):2ND COVER

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1967 MODELS OF MUSCLE Z-BAND FINE STRUCTURE BASED ON A LOOPING FILAMENT CONFIGURATION
J CELL BIOL 34(3):827-840, ILL.

KELLY,DOUGLAS E.
1967 VICTOR CHANDLER TWITTY, NOVEMBER 5, 1901-MARCH 22, 1967
COPEIA 1967(4):887-888, 1 FIG.

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1967 CORTICAL CHANGES IN GROWING OOCYTES & IN FERTILIZED OR PRICKED EGGS OF RANA PIPIENS
J CELL BIOL 34:111-122.

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1967 MUCOCILIARY CLEARANCE FROM BULLFROG (RANA CANTESBIANA) LUNG
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1967 THE THEME: RED-EARED SLIDER PSEUDEMYS SCRIPTA ELEGANS
INT TURTLE TORTOISE SOC J 1(5):4-5, 30.

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KINNEY,STEPHEN (SEE HERCF-967TDW: 579)

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KLUGE,ARNOLD G.
1967 HIGHER TAXONOMIC CATEGORIES OF GEKKONID LIZARDS AND THEIR EVOLUTION
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KNOEPFFLER,LOUIS-PHILIPPE
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1967 REDECOUVERTE DE CHAMAELEO CHAPINI DE WITTE
BIOL GABONICA 3(3):245-247, 1 FIG.

KNOEPFFLER,L.-PH.
1967 BUFO PETITI N. SP. CRAPAUD NAIN DE LA FORET GABONAISE
BIOL GABONICA 3(3):249-252, 4 FIG.

KNOEPFFLER,LOUIS-PHILIPPE (SEE COMC -967PAG: 141)

KNOWLES,ROBERT P. (SEE SNYCC-967PTP:1635)

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MEM FAC ED KUMAMOTO UNIV NO 15(SEC 1):29-37, ILL.
(JAP, ENG ABSTR)

KOCH,ARTHUR L. (SEE EHROW-967VAG: 827)

KOCHVA,ELAZAR AND CARL GANS
1967 THE STRUCTURE OF THE VENOM GLAND AND SECRETION OF VENOM IN VIPERID SNAKES. IN ANIMAL TOXINS. PERGAMON PRESS, NEW YORK. P. 195-203, 17 FIG.

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COPEIA 1967 (4):763-772, 8 FIGS.

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1967 OBSERVATIONS ON A CASE OF REPRODUCTION OF LACERTA LEPIDA DAUDIN IN CAPTIVITY
PRZEGL ZOOL 11(4):441-444, 2 FIG. (ENG. SUMM)

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1967 FIBRINOLYTIC PROTEASES IN SNAKE VENOMS
EXPERIENTIA 23(12):999-1000, 4 FIG.

KORNALIK,FRANZ,SR., FRANZ KORNALIK,JR. AND V.SEICHRT
1967 DIE ANATOMISCHE GRUNDLAGE DES SCHLANGENBISS-MECHANISMUS
ZOOL GARTEN (NF) 33(6):309-319, 8 FIG.

KORNALIK,F. (SEE STYZ -967EPH: 139)

KORNALIK,FRANZ,JR. (SEE KORF -967AGS: 309)

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1967 MODE D'UTILISATION DU SAC VITELLIN AU COURS DE L'EMBRYOGENESE CHEZ LE SERPENT
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1967 PROJECTION OF OPTIC FIBERS TO VISUAL CENTERS IN TURTLE (EMYS ORBICULARIS)
J COMP NEUROL 130(3):263.

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1967 A SOFSHELL COMES TO LIFE
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1967 NEW STATION OF THE NATTERJACK BUFO CALAMITA LAUR.
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1967 REPTILES AND AMPHIBIANS IN THE VICINITY OF CZESTOCHOWA
PRZEGL ZOOL 11(4):414-423, ILL. (ENG. SUMM)

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1967 A RED-BELLIED TURTLE, PSEUDEMYS RUBRIVENTRIS, FROM KENT COUNTY, MARYLAND
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1967 DER JURAKROKODILIER MACHIMOSAURUS H. V. MEYER
PALAEONT Z 41:46-59, 4 FIG.

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1967 TWO NEW SPECIES OF THE GENUS MONOCERCOMONOIDES TRAVIS, 1932 (PROTOZOA: MASTIGOPHORA) FROM REPTILES
PROC INDIAN ACAD SCI B 66(5):184-191, 2 FIG., 1 TABLE

KRISHNAMURTHY,R.
1967 A NEW FLAGELLATE OF THE GENUS MONOCERCOMONAS GRASSI, 1879 FROM THE GREEN SNAKE IN INDIA
RIV PARASSITOL 28(3):161-164, 4 FIGS.

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1967 UNTERSUCHUNGEN UEBER DIE BEZIEHUNG DER KERN-PLASMA-RELATION ZUR KERNGROESSE. IV. DER EINFLUSS DER STRAHLENSCHAEDIGUNG UND HETEROLOGER RNS AUF DAS EPITHEL DER REGENERIERENDEN EXTREMITAET BEI AMBYSTOMUM TIGRINUM GREEN
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AQUATERRA 4(10):79-80, 1 FIG.

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1967 WOZU BAUEN WIR EINEN ZOO IN KABUL
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KUNZ,Y.W. AND J.HEARN
1967 HETEROGENEITY OF LACTATE DEHYDROGENASE IN THE DEVELOPING AND ADULT XENOPUS LAEVIS
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PERGAMON PRESS, OXFORD. P. 335-343, 4 FIG.

KUSAKINA,A.A. (SEE ANDVB-967HCA: 244)

----- L -----

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1967 K SYSTEMATIKE SLEPUCHA LAMAVEHO (ANGUIS FRAGILIS L.) A JEHO ROZSIRENIE NA SLOVENSKU
BIOLOGIA (BRATISLAVA) 22(12):908-921, 6 FIG., 6 TBLS

LAENNERGREN,JAN
1967 CONTRACTURES OF SINGLE SLOW MUSCLE FIBRES OF XENOPUS LAEVIS ELICITED BY POTASSIUM, ACETYLCHOLINE OR CHOLINE
ACTA PHYSIOL SCAND 69(4):362-372, ILL.

LAENNERGREN,JAN
1967 THE EFFECT OF CALCIUM ON POTASSIUM CONTRACTURES OF SINGLE SLOW MUSCLE FIBRES OF XENOPUS LAEVIS
ACTA PHYSIOL SCAND 70:16-25.

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BULL MUS NAT HIST NAT 2 SER 39(4):647-656, 6 FIG.

LAMOTTE,M.
1967 LES BATRACIENS DE LA REGION DE GPAKOBO (COTE D'IVOIRE)
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1967 THE BIOCHEMISTRY OF MELANOTROPIC AGENTS
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LANDRETH,HOBART F. AND DENZEL E.FERGUSON
1967 NEWT ORIENTATION BY SUN-COMPASS
NATURE (LONDON) 215(5100):516-518, 2 FIG.

LANDRETH,HOBART F. AND DENZEL E.FERGUSON
1967 NEWTS: SUN-COMPASS ORIENTATION
SCIENCE 158(3807):1459-1461, 3 FIG.

LANDRETH,HOBART F. (SEE FERDE-967SCO: 45)

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1967 LICHT- UND ELEKTRONENMIKROSKOPISCHE IDENTIFIZIERUNG DER ZELLTYPEN IM INSELAPPARAT DES FROSCHES RANA RIDIBUNDA
Z ZELLFORSCH 82(1):156-172, 7 FIG.

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LANNOM,JOSEPH R. JR. (SEE HODGA-967NNH: 293)

LAPOINTE,JOSEPH LARRY
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LEA,E.J.A. (SEE DICDA-967PSF: 289)

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ANAT REC 158:453-472, 12 FIG.

LENTZ,THOMAS L.
1967 FINE STRUCTURE OF NERVES IN THE REGENERATING LIMB OF THE NEWT TRITURUS
AMER J ANAT 121(3):647-655, 14 FIG.

LEONG,G.F. (SEE BIEN -967EFS: 261)

LERNER,AARON B. (SEE LANS -9678MA: 1)

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LEVINE,R. (SEE PENJC-967ESH: 32)

LEVITON,ALAN E.
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PHILIPPINE J SCI 94(4):519-533, 4 FIG.

LEVITON,ALAN E. AND STEVEN C.ANDERSON
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PROC CALIF ACAD SCI 35(9):157-192, 12 FIG.

LEVITON,ALAN E. (SEE ANDSC-967NSE: 1)

LEVITON,ALAN E. (SEE ANDSC-967NSP: 227)

LICHT,LAWRENCE E.
1967 GROWTH INHIBITION IN CROWDED TADPOLES: INTRASPECIFIC AND INTERSPECIFIC EFFECTS
ECOLOGY 48(5):736-745, 1 FIG.

LICHT, LAWRENCE E.
1967 DEATH FOLLOWING POSSIBLE INGESTION OF TOAD EGGS
TOXICON 5 (2):141-142.

LICHT,PAUL
1967 THERMAL ADAPTATION IN THE ENZYMES OF LIZARDS IN RELATION TO PREFERRED BODY TEMPERATURES. IN MOLECULAR MECHANISMS OF TEMPERATURE ADAPTATION. AMER ASSOC ADVANCE SCI. P. 131-145, 7 FIG.

LICHT,PAUL
1967 ENVIRONMENTAL CONTROL OF ANNUAL TESTICULAR CYCLES IN THE LIZARD ANOLIS CAROLINENSIS
J EXP ZOOL 165(3):505-516, 6 FIG.

LICHT,PAUL
1967 ENVIRONMENTAL CONTROL OF ANNUAL TESTICULAR CYCLES IN THE LIZARD ANOLIS CAROLINENSIS. II. SEASONAL VARIATIONS IN THE EFFECTS OF PHOTOPERIOD AND TEMPERATURE ON TESTICULAR RECRUDESCENCE
J EXP ZOOL 166(2):243-254, 6 FIG.

LICHT,PAUL
1967 INFLUENCE OF TEMPERATURE ON LIZARD TESTES
NATURE 213(5077):672-674, 2 FIG.

LICHT,PAUL
1967 INTERACTION OF PROLACTIN AND GONADOTROPINS ON APPETITE, GROWTH, AND TAIL REGENERATION IN THE LIZARD, ANOLIS CAROLINENSIS
GEN COMP ENDOCRINOL 9(1):49-63, 8 FIG.

LICHT,PAUL AND ALLEN G.BROWN
1967 BEHAVIORAL THERMOREGULATION AND ITS ROLE IN THE ECOLOGY OF THE RED-BELLIED NEWT, TARICHA RIVULARIS
ECOLOGY 48(4):598-611, 11 FIG.

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1967 EFFECTS OF EXOGENOUS PROLACTIN ON REPRODUCTION AND GROWTH IN ADULT MALES OF THE LIZARD ANOLIS

CAROLINENSIS
GEN COMP ENDOCRINOL 8(2):228-244, 6 FIG.
LICHT,P. (SEE MADPF-967EMS: 157)
LICHT,P. (SEE SHOVH-967TDW: 255)
LICKER,KENNETH I. (SEE SCOJL-967MDW: 718)
LIM,GAIK S. (SEE BERPY-967BPP: 307)
LINDEMANN,B. AND U.THORNS
1967 FAST POTENTIAL SPIKE OF FROG SKIN GENERATED AT THE OUTER SURFACE OF THE EPITHELIUM
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1967 EIN NASHORN-LEGUAN, CYCLURA CORNUTA, MIT GABELSCHWANZ IM TIERPARK BERLIN
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Z ZELLFORSCH 82(3):407-433, 15 FIG.

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ANN PARASIT 42(3):343-351, 4 FIG.

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UNDSHIAN,F. (SEE BESV -967NAV: 5)

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CAT AMER AMPHIBIANS REPTILES:50, 1 MAP

UZZELL,THOMAS
1967 AMBYSTOMA LATERALE
CAT AMER AMPHIBIANS REPTILES:48, 1 MAP

UZZELL,THOMAS
1967 AMBYSTOMA PLATINEUM
CAT AMER AMPHIBIANS REPTILES:49, 1 MAP

UZZELL,THOMAS
1967 AMBYSTOMA JEFFERSONIANUM
CAT AMER AMPHIBIANS REPTILES:47, 1 MAP

UZZELL,THOMAS M.,JR. AND SARAH M.GOLDBLATT
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EVOLUTION 21(2):345-354, 4 FIG. (2 MAPS)

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VANABLE, JOSEPH W. JR. (SEE MCGMP-967MSG: 751)

VAN BERGEIJK,WILLEM A.
1967 ANTICIPATORY FEEDING BEHAVIOR IN THE BULLFROG (RANA CATESBEIANA)
ANIM BEHAV 15(2-3):231-238, 4 FIG.

VAN DER KLOOT,WILLIAM G.
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PAP AVULSOS ZOOL 20(17):191-215, 1 FIG., 3 PL.

VARJU,D. (SEE PICSG-967GCF: 545)

VASILIEVA,G.A. (SEE POTDA-967PFF: 501)

VASSAS,J.-M. (SEE TERRR-967COE: 667)

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AMER MIDLAND NAT 78(1):182-187, 1 FIG. (MAP)

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1967 RAINETTES ET CRAPAUDS FAMILIERS
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ANN ZOOL FENNICI 4(4):472-546, 55 FIG., 22 TABLES

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VITALI,T. (SEE ERSV -967MHS:1149)

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COMUN ZOOL ROMANIA 4:21-25, 2 FIGS.

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VOGEL,GUENTHER AND INGRID STOECKERT
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J MED ENT 4(4):387-390, 6 FIGS.

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ZIVA 15(6):225, ILL.

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1967 DISPHOLIDUS TYPUS SMITH - BOOMSLANG IM HAUSTERRARIUM
AQUA TERRA 4(10):77-79, 2 FIG.

VRIES,ANDRE DE (SEE GROL -967IVP: 356)

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MEM SOUTHERN CALIF ACAD SCI (4):1-111, 33 FIG.

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SOUTHWESTERN NAT 12(4):455-462, 1 FIG.

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TULANE STUD ZOOL 14(2):63-73, 12 FIG.

WEBB,ROBERT G. (SEE BAKRH-967NRM: 223)

WEIMANN,JOHN
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EASTERN CAPE NAT 1967(30):16-19, 1 FIG.

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J MORPHOL 122(3):203-227, ILL.
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1967 EIN SCHILDKROETENREST (THALASSEMYDIDAE) AUS DEN SOLNHOFENER PLATTENKALKEN
MITT BAYER STAATSAMML PALAEONTOL HIST GEOL 13(7): 181-192, 2 FIG.
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DAS TIERREICH 86:1-XIV, 1-127.
WERNER,YEHUDAH L.
1967 REGENERATION OF SPECIALIZED SCALES IN TAILS OF TERATOSCINCUS (REPTILIA: GEKKONIDAE)
SENCK BIOL 48(2):117-124, 8 FIG.
WERNER,YEHUDAH L.
1967 REGENERATION OF THE CAUDAL AXIAL SKELETON IN A GEKKONID LIZARD (HEMIDACTYLUS) WITH PARTICULAR REFERENCE TO THE 'LATENT' PERIOD
ACTA ZOOL 48:103-125, 22 FIG.
WESTPHAL,F.
1967 ERSTER NACHWEIS DES RIESENSALAMANDERS (ANDRIAS, URODELA, AMPHIBIA) IM EUROPAEISCHEN JUNGLIOZAEN
N JB GEOL PALAEONT MH 1967:67-73, 1 FIG.
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J MORPHOL 123(4):355-372, 15 FIG.
WEYNE,J. AND A.DE HEMPTINNE
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1967 ALBINOTIC SPECIMEN OF BOMBINA VARIEGATA (L.) FOUND IN EASTERN CARPATHIAN MOUNTAINS
PRZEGLAD ZOOL 11(3):306-310, 4 FIG.
WILDER,J. AND FRANK MORRELL
1967 SECONDARY EPILEPTOGENESIS IN THE FROG FOREBRAIN
NEUROLOGY 17(11):1041-1051, 9 FIG.
WILLIAMS,ERNEST E. AND WILLIAM E.DUELLMAN
1967 ANOLIS CHOCORUM, A NEW PUNCTATUS-LIKE ANOLE FROM DARIEN, PANAMA (SAURIA, IGUANIDAE)
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1967 CHELONIA DEPRESSA GARMAN RE-INVESTIGATED
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PSYCHON SCI 9(5):259-260, 1 FIG.
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WILSON, LARRY DAVID
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TOXICON 5 (2):91-95, 2 FIGS.
ZALTA,JEAN-PIERRE (SEE DUPA -967AFC:2508)
ZALTA,J.P. (SEE DUPAM-967EWC:2508)
ZAPATA,P. AND C.EYZAGUIRRE
1967 BIOASSAY OF ACETYLCHOLINE ON THE SINUS VENOSUS OF THE FROG
CANADIAN J PHYSIOL PHARM 45(6):1021-1032, 7 FIG.
ZEIDMAN,GLORY (SEE GRIRS-967AES: 781)
ZEMAN,WILLIAM V., FRANK G.FALCO AND JOHN J.FALCO
1967 REPAIR OF THE CARAPACE OF A BOX TURTLE USING A POLYESTER RESIN
LAB ANIMAL CARE 17(4):424-425, 1 FIG.
ZENDZIAN,ESTHER N. & ERIC A.BARNARD
1967 DISTRIBUTIONS OF PANCREATIC RIBONUCLEASE, CHYMOTRYPSIN, AND TRYPSIN IN VERTEBRATES
ARCH BIOCHEM BIOPHYS 122:699-713, 2 FIG.
ZENDZIAN,ESTHER N. & ERIC A.BARNARD
1967 REACTIVITY EVIDENCE FOR HOMOLOGIES IN PANCREATIC ENZYMES
ARCH BIOCHEM BIOPHYS 122:714-720, 1 FIG.
ZIEGLER,F.D., LEILA VAZQUEZ-COLON, W.B.ELLIOTT, CARL GANS AND A.TAUB
1967 PRODUCTION BY SNAKE VENOMS OF UNCOUPLING ACTIVITY AND REVERSE ACCEPTOR CONTROL IN RAT LIVER MITOCHONDRIAL PREPARATIONS. PART II.-STUDIES ON ENERGY METABOLISM FOLLOWING TREATMENT OF MITOCHONDRIA WITH SEVERAL SNAKE VENOMS. PAGE 236-243, 4 FIG., 1 TABLE. IN RUSSELL, FINDLAY E. AND PAUL R. SAUNDERS (EDS.), ANIMAL TOXINS, PERGAMON PRESS, OXFORD.
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ZMICH,JAMES (SEE LYNWG-967TML: 245)
ZUCCONI, DAVID
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REPRINTED FROM IN ANIMALAND 1965 32 (5)
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CAN FIELD-NATUR 80(3):162-165, ILL.
ZWEIFEL,RICHARD G.
1967 ELEUTHERODACTYLUS AUGUSTI
CAT AMER AMPHIBIANS REPTILES:41, 1 FIG., 1 MAP
ZWEIFEL,RICHARD G.
1967 A NEW SPECIES OF MICROHYLID FROG (GENUS SPHENOPHRYNE) FROM NEW GUINEA
AMER MUS NOVITATES 1967(2309):1-6, 2 FIG.

■■■■



herpetological REVIEW

september 1967 1

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The Society was founded in 1958 as The Ohio Herpetological Society. Following rapid growth of membership and expansion of operations, due largely to the diversity and originality of its publications program, the organization became the Society for the Study of Amphibians and Reptiles in 1967. Publisher of the Journal of Herpetology, Herpetological Review, and Facsimile Reprints in Herpetology (all of which are received by members), the Society has an international membership open to all persons interested in amphibians and reptiles. Regular dues are $4.00 worldwide and should be remitted (preferably via international money order outside the U. S. A. and Canada) to the Secretary-Treasurer. Members are invited to subscribe to the higher categories of Sustaining ($5.00), Contributing ($15.00), or Life ($100, in four payments of $25.00) membership. Institutional subscription is $6.00. A complete list of publications of The Ohio Herpetological Society and the Society for the Study of Amphibians and Reptiles is available from the Publications Secretary.

HERPETOLOGICAL REVIEW

Herpetological Review is published irregularly and is received by all members & subscribers of the Society for the Study of Amphibians and Reptiles. Any original herpetological material other than biological research will be considered for inclusion in the Review and is earnestly solicited. Authors should first write to the Editor before submitting feature articles. Unpublished photographs of unusual nature or of uncommon amphibians or reptiles are desired; prints, preferably larger than they would appear when published, should be accompanied by exposure data, if available, and descriptive caption. Contributor's name & address should be taped or penciled on back of print; photos not published will be returned. Members may place ads in the classified section without charge. Letters from readers pertaining to the field of herpetology may be published, with writer consent, if deemed of interest by the Editor. If desired, reprints of contributions can be supplied. The Review will accept commercial advertising; rates are available from the Editor. Herpetological Review is edited by Corson Jay Hirschfeld, 9045 Indian Ridge Road, Cincinnati, Ohio 45243.

introduction...

It has always been our intent that the Society's operations effectively meet the varied needs of our diverse membership; when possible we have sought to render to our members services elsewhere unavailable. Thus, for example, in addition to our scientific Journal, we began publication of our successful facsimile reprint program. Our informal newsletter has been the only such publication widely available to herpetologists.

We have become aware of substantial interest among members in the non-technical material which has appeared from time to time in the Journal and regularly in the newsletter, such as literature lists, reviews, news notes, and biography. In fact, this interest is sufficient to justify our increasing the publication of this sort of literature. The format of the old newsletter would not favorably allow inclusion of lengthy material, and combining scientific, popular, and trivial matter under one cover (i. e., in the Journal) would be problematical, since scientific and non-technical articles do not necessitate or even lend themselves well to the same format, editorial attention, and so forth. Consequently, we are restricting biological research to the Journal and publishing semi- and non-technical material in our new-format informal publication, Herpetological Review.

Herpetological Review incorporates the Ohio Herpetological Society Newsletter. Its primary function, as the name states, will be to review herpetology, past and present, in terms of the individuals, institutions, literature and other components of the field. Perhaps equally important, the Review will provide a unique means of communication among persons interested in amphibians and reptiles. We believe it will be of interest to both the amateur and professional and we hope all members will find it informative and entertaining. Future issues will contain, in addition to the type of material in this first number, letters from members and commercial advertising. We anticipate articles on history, biography, and the status of herpetology in various countries. Other features will be added as indicated by your interest.

—Corson Jay Hirschfeld, Editor

CONTENTS

2 . . . . . Society Life, Contributing, and Sustaining members.

2 . . . . . 1966 Treasurer's Report.

3 . . . . . "Titles and Selected Abstracts of Papers Presented at the First Herpetological Conference of the USSR'," by Rozella B. Smith, Tom Lewis, and Hobart M. Smith.

9, 10 . . . . . News from Institutional Members: Milwaukee County Zoological Park, University of Texas Brackenridge Field Laboratory, University of Chicago, Staten Island Zoo, Institute of Scientific Information.

11 . . . . . Member Ads.

11 . . . . . The Literature.

12 . . . . . Review: "Natural History of Cottonmouth Moccasin, Agkistrodon piscivorus (Reptilia)," by Ray D. Burkett (J. P. Kennedy).

12 . . . . . Recent Titles.

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We gratefully acknowledge the following persons who have subscribed for 1967 to the higher Society membership categories: the Life, Contributing and Sustaining memberships. As the Society operates on a limited budget, this support is of meaningful benefit and allows expansion impossible through regular income.

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TREASURER'S REPORT — 1966

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$ 1160.00	Dues and subscriptions
433.00	Sale of author reprints
434.07	Sale of back issues
380.16	Donations and contributions (includes color plate)
44.01	Balance carried over from 1965
34.50	Annual Meeting registration fee
$ 2485.74	Total income for 1966

Expenditures

$ 688.03	Journal 5(3) & author reprints
668.77	Journal 5(4) & author reprints
210.94	Eschscholtz facsimile
185.00	Boulenger #2 facsimile
174.50	Boulenger #3 facsimile
97.60	Grey facsimile
24.80	Newsletters
190.96	Postage
77.10	Secretarial assistance & supplies
44.67	Bad checks, rubber stamps, long distance phone calls
14.60	Bank charges
$ 2476.97	Total expenditures for 1966

1966 Income	$ 2485.74
1966 Expenses	2476.97
Balance	$ 8.77

Respectfully submitted,
Joseph T. Collins, Secretary-Treasurer

titles and selected abstracts
of papers presented at

THE FIRST HERPETOLOGICAL CONFERENCE OF THE USSR

by ROZELLA B. SMITH,
TOM LEWIS
and HOBART M. SMITH

On 12-14 October 1964 the first herpetological conference of the USSR was held in Leningrad under the chairmanship of Dr. Paul V. Terent'ev.* Abstracts of 74 papers, selected for their broad significance and impracticality of presentation at the Conference, were published in a separate, 84 page pamphlet distributed at the meetings. The papers presented for the most part complemented and did not duplicate the abstracted papers. Several of the papers presented in these sessions but not abstracted are: (1) L. I. Khozatskii, Leningrad: "The history of the herpetofauna of the USSR"; (2) A. G. Bannikov, Moscow: "Prodrome of a monograph on the herpetology of the USSR"; (3) I. S. Darevskii, Leningrad: "Parthenogenesis in reptiles"; (5) L. Berger, Poland: "On interbreeding of Green frogs"; (6) I. K. Murygina, Tula: "The role of adders in nature in Sakhalin"; and (7) P. V. Terent'ev, Leningrad: "The interrelationships of frogs of the Palearctic and Nearctic." Presumably these and all other papers involved in the Conference, abstracted or not, eventually will appear in a symposium volume.

We present below in English the title, length of abstract (varying from 13 to 127 lines) and, where appropriate, a brief statement of content, for each of the 74 papers summarized in the abstract brochure (microfilm copies available from the University of Illinois Library, $1.50): Voprosy Gerpetologii /Problems of Herpetology/. Paul V. Terent'ev, editor. 1964 /12 October/. University of Leningrad. 84 p., 8 vo., paper-covered, stapled, printed pamphlet. Titles are not always literally translated. Transliterations conform with the Library of Congress convention. Scientific names in parentheses or unenclosed were given in the abstracts; those in brackets were supplied by us on the basis of common names used in the abstracts and the corresponding scientific names for them given in Terent'ev's summary of 1956. **

1. Alekierov, A. M. (Azerbaijan Univ.) Herpetogeny of Azerbaijan. (53 lines)

2. Aliev, F. F. (Academy of Science, Azerbaijan SSR, Zoological Institute.) Change in range and population of reptiles under the influence of climatic and anthropogenic factors in various parts of Azerbaijan. (51 lines)

3. Andrushko, A. M. (Leningrad Univ.), and N. N. Banina (Academy of Science, USSR, Institute for the history of natural science.) Infection of the green toad (Bufo viridis) by opalinids in Uzbek. (29 lines)

4. Bazhanov, V. S. (Academy of Science, Azerbaijan SSR, Zoological Institute.) Tracks of early tetrapods in Kazakh. (26 lines) Foot and tail tracks were found in 1960 in copper mines in formations 300 feet below the ground surface in strata of the late Carboniferous. Chirotherium tracks were taken in the Bakanamov region in the lower Permian.

5. Bannikov, A. G. (Veterinary Institute, Moscow.) Geographical and ecological features of the herpetofauna of tropical forests of southwest China. (29 lines) A brief statement of the number of species of the more characteristic genera of herpetozoa in the area south of the Mekong Basin is accompanied by a series of most provocative generalizations. Despite absence of marked seasonal variation in temperature, reproduction is strongly seasonal in both amphibians and reptiles. The summer rainy season is the reproductive season for all amphibians because of the high humidity, and for aquatic amphibians because of the high oxygen content of surface water; it is the reproductive season for reptiles because of the activity and abundance of food in the form of insects, amphibians and birds. The abundance of amphibians reproducing out of water is a product of the abundance of aquatic predators, especially dragonfly nymphs. The nocturnal activity of amphibians (except Kaloula) is

*See "The First Herpetological Conference of the USSR," by the authors of the present article (Bioscience, 15(12):801-2, 1965), for a discussion of the background and significance of the Conference.

** Terent'ev, Paul V. 1956. Praktikum po zoologii pozvonochn'ikh /Manual of vertebrate zoology/. Moscow. 520 p., 172 figs. (Herpetology, p. 185-273, figs. 58-129.)

related not to temperature and humidity but to insect activity. The abundance of arboreal and aquatic forms of lizards and amphibians, and scarcity of terrestrial forms, is a product of absence of ground cover and food.

6. Barkagan, Z. S. (Medical Institute, Barnual.) Clinico-experimental analysis of a few of the main problems of pathogenesis and the therapeutics of poisoning by vipers. (127 lines) A succinct, inclusive summary is given of chemicophysiological effects of venom of Vipera berus, V. lebetina and Echis carinatus introduced experimentally by various routes, and of treatment for snake bite. Antivenin and suction are recommended, accompanied by varied palliatives for the vascular and hematological distrubances caused by the venom. Most of the abstract concerns the latter subject. Notable points include: (1) the edematic-hemorrhagic syndrome is more pronounced in man, necrosis in laboratory animals; (2) intravenous envenomation produces death before edematic-hemorrhagic signs develop; (3) preliminary injection of heparin reliably averts fatalities from intravenous envenomation of up to 10 MLD; (4) tagging of blood proteins shows that systemic vascular permeability increases by average about twice, with the greatest increase occurring at the site of envenomation, in the lungs, liver and kidneys, the least in the brain; (5) shock from snake bite is two-phased; (6) envenomated blood passes through first a coagulation phase, then a phase of incoagulability; (7) heparin is contraindicated in the incoagulable phase; (8) blood transfusion is of great value in offsetting hemorrhagic effects; and (9) cauterization, phlebotomy, local use of potassium permanganate and internal use of alcohol are contraindicated.

7. Belova, Z. V. (Moscow.) Qualitative analysis of food of tadpoles of the lake frog /Rana ridibunda/. (16 lines)

8. Berdongraov, K. (Alma-Ata Veterinary Institute.) Heart activity in snakes after full discontinuation of respiration. (15 lines)

9. Bogdanov, O. P. (Academy of Science, Uzbek SSR, Institute of Zoology and Parasitology.) Factors influencing the reproduction of lizards in Central Asia. (44 lines) The larger (older) examples of all species breed 10-15 days earlier than smaller (younger) examples, and lay more eggs. Protracted spring extends ovulation to an entire month. The greatest variation of date occurs in cultivated areas, the next greatest in sandy areas, least in cliff areas. Psammophilous species reproduce later than those living on hard substrates, and individuals inhabiting rugged terrain reproduce earlier than those of plains areas. Rainy periods followed by warm weather causes rapid ova maturation, which almost ceases in protracted dry weather.

10. Borkhvardt, V. G. (Leningrad Univ.) Some lines of evolution of the vertebral column of secondarily aquatic reptiles. (35 lines)

11. Vasil'ev, B. D., and G. N. Sitkin. (Moscow Univ.) Exteroception of reptiles and amphibians. (67 lines) Outstanding recent discoveries are summarized; some authorities and dates are cited. Short-distance orientation of reptiles by sun position, and long-distance navigation of sea turtles by the stars, are noted.

Nocturnal species (e. g., Bufonidae, Palobatidae) lack color vision, crepuscular types have little (e. g., Limnodynastes tasmaniensis sees only dark blue). Diurnal species have good color vision: Rana pipiens, R. clamitans, B. bombina distinguish all basic colors, Discoglossus pictus yellow only, Rana latastei yellow and yellow-green, Rhacophorus buergeri and Leptodactylus ocellatus orange, yellow and yellow-green, Ceratophrys americana red and dark blue. Among reptiles, Emys orbicularis, Clemmys caspica, Lacerta agilis, L. viridis and Anolis carolinensis distinguish five to eight colors, and several species differentiate shades of red-yellow. Infra-red photoreception is suspected and requires further study.

Snakes have been shown to be deaf to air-borne sounds, receptive to ground-borne sounds. Recent experiments prove sound reception of air-borne waves does occur in turtles. Tachydromus hears frequencies as high as 12,500 cps., amphibians 12,000 to 15,000 cps.; Rana catesbeiana may perceive ultra-high frequency waves.

Xenopus laevus is highly chemoreceptive; severance of its Jacobson's organ nerve does not diminish the sensitivity.

Thermoreception is proved for crotalid snakes distinguishing temperature differences as small as a few thousandths of a degree.

Turtles react strongly to X-rays.

12. Voĭtkevich, A. A. (Voronezh Medical Institute.) Patterns of duplication in supernumerary formations of the posterior appendages in frogs in nature. (56 lines)

13. Gaĭzhauskene, I. I. (Kaunas.) The amphibian fauna of Lithuania and its biology. (27 lines)

14. Garanin, V. I. (Academy of Science, USSR, Kazan.) History of the herpetology of the Volzhsk-Kamska region. (38 lines) A strictly historical survey of herpetological publication on the area, from Pallas in 1831 and Eversman in 1834 to the present. A gradual shift to ecological, economic and other aspects, rather than faunistics, is noted, beginning in the 1920's and now nearly complete. Thirty authors are mentioned.

15. Gramenitskiĭ, E. M. (Medical Institute, Leningrad, Department of Public Health.) Seasonal cytochemical changes in the cutaneous glands of the grass frog /Rana temporaria/. (26 lines) One-hundred eighty grassfrogs studied over a three year period reveal that in winter, spent under water, the granular and small mucous glands are quiescent, the large mucous glands active. Emerged from hibernation, just the reverse of glandular activity occurs. In the active glands, in both situations, the RNA, proteins and NH_2 groups are markedly increased.

16. Darevskiĭ, I. S. (Academy of Science, USSR, Leningrad, Zoological Institute.) Ancestral signs in hybrids as an indication of phylogeny of a group of cliff lizards /Lacerta saxicola/ of the subgenus Archaeolacerta. (47 lines) Lacerta saxicola mixta apparently arose by hybridization of L. derjugini and L. saxicola. L. s. dahli has a double postnasal scale, practically never found in other forms of saxicola but normal in L. graeca, L. oxycephala and other adjacent southern species. Hybrids between the parthenogenetic and bisexual subspecies of L. saxicola have enlarged dorsal head scales like the adjacent L. horvathi which in turn has a color pattern

like L. s. mixta. The presence of six of the nine species of L. (Archaeolacerta) in southern Europe along with 13 species of L. (Podarcis) suggests an ancient center of species-formation there. L. saxicola is a more recent invader from Asia, as indicated by the existence in its hybrids of several traits of more ancient European forms.

17. Dudusenko, L. M. (Kishinev Univ.) Lizards of Moldavia. (38 lines)

18. Droedov, N. N. (Moscow Univ.) Biology of the green-bellied lizard (Lacerta chlorogaster). (53 lines) The ribbon-like range follows small valleys in mountainous forested regions of Azerbaijan. In settlements of medium density the lizards live 25-35 meters apart, and reach their maximum density at 1/100 m^2. Territories are strongly defined, with one or two good hideouts in each, on a treetrunk or in rocky fissures. Food, date of egg-laying, number of eggs, hatching dates, size of young and ectoparasites are summarized. Strong sexual dichromatism develops in spring and disappears by July. Stereotyped behavior was studied but not summarized in the abstract.

19. Egorov, P. S. (Tashkent.) The history of the study of poisonous snakes and their venoms in Central Asia. (92 lines)

20. Zhavoronkov, A. A. (Dushanbe.) Influence of heparin on the morphological picture of experimental envenomation by menas of viper venom. (74 lines) Experiments on rabbits demonstrate that injection with therapeutic intent of heparin into the victim of viper bite is fraught with major hazards connected with aggravation of vascular permeability and of the hemorrhagic syndrome.

21. Ziniakova, M. P. (Academy of Science, Uzbek SSR, Institute of Zoology and Parasitology.) Rate of growth of the Central Asiatic viper [Vipera lebetina] in captivity. (6 lines, table of 7 lines) Seven hundred eighty-one specimens, 255-1500 mm in total length, were put in a terrarium from 28 April 1961 through 25 May 1962; 299 remained alive by 10 October 1962. Growth records show that the smallest specimens grew the most (0.25 mm/day), and the largest the least (0.04 mm/day). None of the smallest failed to grow, whereas 59% of the largest were not observed to grow.

22. Iordanskiĭ, N. N. (Moscow Univ.) Phylogeny of modern crocodiles. (58 lines) A brief review of the phylogeny of Crocodylia, basically following Huene's theory rather than that of Fraas and Kälin.

23. Il'ichev, V. D. (Moscow Univ.) Evolution of the external ear of terrestrial vertebrates. (49 lines) The most progressive groups of reptiles (lizards, crocodilians) exhibit the greatest development of the external ear in their class. All functional stages occur, from the simple slit to the depressed meatus and finally to the marginal, megaphonic ornamentations. The adaptation is as profound as the middle ear can accommodate in harmony with the behavioral efficiency of any given species in its environmental niche. The functional stages evident in reptiles are paralleled in the evolution of terrestrial vertebrates in general. Otic perfection has been of great significance in speciation in many tetrapod lines, leading to the development of numerous analogies and parallelisms in structure of the external ear in amniotes.

24. Ishunin, G. I. (Academy of Science, Uzbek SSR, Zoological Institute.) Food of sand vipers [Echis carinatus] in Usbek and Turkmen. (18 lines)

25. Ishchenko, V. G. (Academy of Science USSR, Ural'sk Biological Institute.) Discoveries of the Siberian Hynobiid [Hynobius keyserlingi] in the north. (16 lines) At 60° 40', on the shores of a tundra lake near the Khadytaiakh River, and in the northern Urals in the Ob River valley, about 67°, specimens were found on several occasions in August. Females bore eggs ready to lay the following year. Young still possessed gills but were on land.

26. Kanen, S. V. (Leningrad Univ.) A mathematical analysis of insular lizard faunae. (21 lines, 1 table) Terent'ev first noted the close relation between area and number of species of lizards on oceanic islands. We have extended his formula $y = bx^a$, accounting for 90% of known variation in number of species on different islands by adjusting for surface irregularity, climate and area.

27. Kalashnikov, V. P. (Academy of Science, Usbek SSR, Institute of Zoology and Parisitology.) Physiology of the gaseous interchange in poisonous snakes of Asia. (86 lines)

28. Kas'ianeko, V. G. (Academy of Science USSR.) The role of comparative-anatomical research in the field of herpetology for interpretation of the paths and conformity to the law of evolution of the organs and systems in mammals. (43 lines)

29. Kistiakovskiĭ, A. B., and L. A. Smogorzhevskiĭ. (T. G. Shevchenko Univ., Kiev.) New data on range-expansion of reptiles and amphibia in Priamurye. (19 lines)

30. Kotliarevskaia, V. A. (Novosibirsk.) Local migrations of five anurans. (44 lines) Recaptured specimens, of 491 marked by finger-clipping, of five species of terrestrial frogs [Rana esculenta, R. ridibunda, R. temporaria, R. terrestris, B. bombina] near L'vov, Poland, revealed marked differences between the species in extent of migration from spring breeding ponds, and in habitat preferences during the summer.

31. Krapivnĭ, A. A. and M. I. Kroshchenko. (Vitebsk.) Herpetology in northern Byelorussia. (13 lines)

32. Krolenko, S. A. and N. N. Nikol'skiĭ (Academy of Science USSR, Cytological Institute.) Heat stability of muscle tissue of some amphibians of southeastern Asia. (17 lines)

33. Kuznetsov, V. V. (Academy of Science, Kazakh SSR, Zoological Institute.) Freshwater turtles of the Mesozoic and Cenozoic of Kazakh. (45 lines)

34. Kushniruk, V. A. (L'vov Univ.) Hibernation of amphibians in the southern Ukraine. (27 lines) Lake frogs [Rana ridibunda] were found hibernating in silt on the bottom of a pond; grass frogs [R. temporaria] and sharp-muzzled frogs [R. terrestris] in silt under 1.2 m of water in peat bogs. With the latter were found pectinate tritons [Triturus cristatus]. Carpathian tritons [T. vulgaris] hibernate in the subalpine zone on dry land under fallen logs or rocks, and in stumps; larvae at subalpine levels hibernate in water, not transforming until the following spring, whereas at lower altitudes

they metamorphose before winter and hibernate on land. Spotted salamanders hibernate in caves, under rotten stumps, in piles of leaves, in holes in the ground.

35. Parionov, P. D., N. G. Solomonov and G. P. Parionov. (Yakutsk Univ.) The dispersal and biology of amphibians and reptiles in Yakut ASSR. (50 lines)

36. Lesniak, A. P. (Academy of Science, Usbek SSR, Institute of Zoology and Parasitology.) Food of /Agkistrodon halys/ in populations of the great sand dunes of southern Pribalkhash. (31 lines)

37. Lukina, G. P. (Rostov on the Don.) Herpetofauna of western Caucasus minor. (22 lines)

38. Mazhuga, P. M. (T. G. Shevchenko Univ., Kiev.) Homologies of the circulatory trunks of the appendages of terrestrial vertebrates. (83 lines) Homologous appendicular vessels commonly are given different names and are thought to be merely analogous in different groups of tetrapods, although there is no question of homologies of bone and muscle. On the contrary, rudimentary capillary systems embryonically precede vessel formation; vessels appear in correlation with the parts that develop most importantly. Thus vessels are firmly correlated with their "nourishing" organs not only morphologically and functionally, but also ontogenetically. However, only vessels connected with homologous appendicular organs can be regarded as homologous.

39. Mazurmovich, B. N. (T. G. Shevchenko Univ., Kiev.) Present status and problems of the study of the parasitofauna of amphibians and reptiles of the USSR. (77 lines)

40. Manzil', S. F. (Academy of Science Ukraine SSR, Zoological Institute.) Some problems on the evolution of cheiroptergia in the light of data on structure of the pectoral appendages of amphibians and reptiles. (79 lines) Important light on problems of evolution of cheiropterygia can be obtained from a study of living and fossil herpetozoa. Our investigations show that transition from synchondroses to diarthroses was the chief factor in modification of the ichthyopterygium to form the cheiropterygium; modern amphibians like frogs and ambystomids have an intermediate type of articulation, agonarthrosis. Autopodial locomotion is not primitive; it first appeared in Permian cotylosaurs, whereas Devonian stegocephalians had zeugopodial-autopodial locomotion. In mammals the carpals, unlike the digits, lack tendinous attachments, except for the pisiform; several carpals have them in reptiles. The pisiform appears to be a modified radial since it has ligamentous connections like the digits. The dual origin of the hamate is supported by the separate elements that represent it in Varanus (with synchondrosis) and Emys orbicularis (with syndesmosis).

41. Markuze, V. K. (V. I. Lenin Pediatrics Institute, Moscow.) The ecological role of certain frogs and snakes in the fish hatcheries of the Volga Delta. (48 lines) The lake frog /Rana ridibunda/, contrary to popular opinion, preys very little on fry in fish hatcheries. Stomach analyses of 1400 frogs indicate only 0.06-0.08% of the fry are eaten by frogs, which subsist primarily on invertebrates although in sluice areas with abundant fry 91% of the frogs eat them (mean of 9/stomach). Availability dictates dietary importance; ants and bees are common.

Water grass-snakes /Natrix tesselata/ eat 0.13-0.31% of the fry (260 stomachs examined). The species lives almost entirely on fish, but the population is small, about 750 in a 690-hectare hatchery.

Common grass-snakes /Natrix natrix/ feed almost entirely on lake frogs. The population is large, about 4000-5000 in a 690-hectare hatchery.

42. Movchan, N. A. and N. S. Gabaeva. (Leningrad Univ.) On the antibiotic properties of the egg envelopes of grass frogs /Rana temporaria/ and steppe turtles /Testudo horsfieldi/. (38 lines) The jellylike evnelopes of the eggs of the grass frog and the albumen of the eggs of the steppe tortoise experimentally were shown to have strong antibiotic action on a wide spectrum of microorganisms. Histological study of freshly-collected frog eggs revealed bacteria only on the outer surface of the gelatinous envelopes.

43. Nedialkov, A. D. and A. I. Kochevskiĭ. (Tashkent.) Winter activity of the viper /Vipera lebetina/. (22 lines)

44. Nurumov, T. N. (Academy of Science, Kazakh SSR, Zoological Institute.) Occurrence of dinosaur remains in Kazakh. (33 lines)

45. Okulova, N. M. (Academy of Medicine USSR, Institute of poliomyelitis and virus encephalitis.) The biology of the roundheads of western Kazakh. (17 lines) In May and June /Phrynocephalus guttatus/ and /P. mystaceus/ were observed. A large percentage of young is found at all times, even in spring (80-82%), and females predominate throughout the year. The lizards are omnivorous; vegetation is often eaten, as well as insects, earthworms, and other invertebrates. Egg-laying is described.

46. Okulova, N. M. (Academy of Medicine USSR, Institute of poliomyelitis and virus encephalitis.) Notes on the biology of the variegated lizard in western Kazakh. (30 lines) In April-June along a 131 km route /Eremias arguta/ was found 1.98/km in a clay-soil desert, 2.4/km in sandy desert, the young comprising 25-30% of the population. The young comprise 60-70% of the population in August, 80-85% in September-October. Male-female ratio is 100 to 130 in April, 100-130 in June, 100-100 in fall due to the young. Sexual maturity occurs in the second year, at a length of 55 mm. Ovarian activity persists throughout the year while not in hibernation. Broken tails occur in 2.8% of the population.

47. Pashchenka, Iu. I. (T. G. Shevchenko Univ., Kiev, Zoological Museum.) New data on the dispersal of several reptiles in Turkmen. (31 lines)

48. Pereshkol'nik, S. L. (Moscow.) Population of amphibians and reptiles of the Priosk terrace national area. (14 lines)

49. Petrov, V. V. (Leningrad.) Synonymy of two nominal subspecies of Lacerta saxicola. (20 lines, 1 table) Analysis of 50 examples (localities not cited) reveals that L. s. obscura Lantz and Cyren is a junior synonym of L. s. rudis Bedriaga.

50. Polozhikhina, V. F. and A. S. Khalanskiĭ. (Moscow.) Biology of the viviparous lizard /Lacerta vivipara/ in the central Urals. (48 lines) In the vicinity of Lys'venski, the species occupies all biotypes but is most abundant in open areas (28.4/hectare) and in partially cleared areas (78/hectare). The food corresponds quantitatively with a wide

variety of prey. Sexual maturity is attained in two years. Females bear as many as ten young at a time. Size groups are described.

51. Polushina, N. A. and V. A. Kushniruk. (L'vov Univ.) On the dispersal of several species of amphibians in Carpathia. (59 lines)

52. Rozhdestvenskiĭ, A. K. (Academy of Science USSR, Paleontological Institute.) On the increase of variability in dinosaurs. (68 lines)

53. Rustamov, A. K. (Turkmen Institute.) The herpetofauna of Turkmen: its structure, distribution and relationships. (56 lines)

54. Salukhov, R. S. (Tashkent.) Reptiles of the central part of the Fergana valley. (26 lines)

55. Sviridov, A. I. (Medical Institute, Kiev.) On the intraorganic lymphatic vessels of reptiles. (36 lines) Injections of 47 reptiles (turtles, crocodilians, squamatans) revealed that lymphatic capillary networks in several organs (e. g., stomach, intestine) are better developed (with a greater density, increase in number of layers, etc.) than in mammals.

56. Sokolov, V. E. (Moscow Univ.) Adaptive features of the integument of amphibians of the SSSR. (34 lines)

57. Strautman, F. I., B. F. Sukhomlinov, V. A. Kushniruk and N. D. Chugunov. (L'vov Univ.) Electrophoretic research on blood-serum proteins of various amphibians. (31 lines)

58. Strelkov, P. P. (Academy of Science USSR, Zoological Institute.) The significance of the lake from /Rana ridibunda/ in maintenance of fish hatcheries of the Volga delta. (88 lines) Stomachs of over 500 frogs revealed extensive change in diet during the year. In May and early June the basic diet is ground insects; at dusk a mass exodus occurs to land in search of food. By mid-June the exodus ceases as the frogs feed (80% of stomachs examined) on tadpoles and, later, the young at transformation, supplemented somewhat with aquatic invertebrates and (5%) small fish. Frogs in nearby natural bodies of water similarly shifted from terrestrial to aquatic foods, although no fish were encountered in their stomachs. Only where and when young fish were badly overcrowded did frogs subsist primarily on fish. Frogs are never importantly detrimental in pisciculture unless the fish are overcrowded. Contrariwise, they divert the activities of numerous predators (e. g., snakes, birds) which would, in the absence of frogs, eat fish, and they in turn prey upon numerous aquatic enemies (e. g., dragonfly larvae) of fish. The only desirable control measure is restriction of access in times and places where young fish must be impounded in overcrowded conditions.

59. Strel'nikov, I. D. (Leningrad.) Biometrical relations of brain and body in herpetozoa. (87 lines) A general discussion of the most basic relations of brain and body size, with very few illustrative data. Three relations are well established for endotherms: (A) the less the weight of any species, (1) the greater the relative weight of the brain, and (2) the higher the metabolic rate; and (B) the less the average weight in adults of the species of any systematic group, the greater the number of species.

After analysis of the scattered data now available, it is concluded that some of these relations pertain also to herpetozoa; in addition it is proposed that in ontogeny of any herpetozoan the greater the body weight the lesser the relative weight of the brain.

A plea is made for study of biometry, anatomy, and physiological aspects of the ecology of herpetozoa.

60. Sukhanov, V. B. (Academy of Science USSR, Paleontological Institute.) Locomotion in lizards and its bearing on locomotion in terrestrial vertebrates. (98 lines) Intercyclical asymmetrical locomotion - as in frogs, sea turtles, virds, pterodaurs - is based upon a type of appendicular coordination entirely different from that characteristic of the intracyclical symmetrical locomotion practiced by virtually all other tetrapods. From the primitive walk evolved the pace-walk and pace on one hand, the trot-walk and trot on the other. The pace-walk and pace are mechanisms available only to mammals. Fast movement in a rapid trot is inherent in such diverse groups as the iguanomorphs and the skinkogekkonomorphs. Most of the former lost their ability to move slowly, whereas the latter evolved a capacity to move slowly by reduction of the length of the hind legs and predominance of the forelegs in movement. The fast trot reliant upon the hind legs has led repeatedly to bipedalism, even in Permian archosaurs. A true trot does not occur in amphibians.

61. Tonorkova, L. Ia. (Ural'sk Univ.) Geographic variation in sharp-snouted frogs /Rana terrestris/. (38 lines)

62. Telepneva, V. P. (Leningrad Univ.) New data on Pliocene turtles in Moldavia and the Ukraine. (28 lines)

63. Flunt, V. E., Iu. A. Dubrovskiĭ and V. M. Neronov. (N. F. Gamalei Institute of Epidemiology and Microbiology.) Individual variability in coloration of Persian Contia and its bearing on subspecies structure. (26 lines)

64. Fomina, M. I. (Academy of Science, Uzbek SSR, Institute of Zoology and Parasitology.) Daily activity of the steppes viper /Vipera ursini/ under conditions of open air cage maintenance. (17 lines) Three hundred twenty /Vipera ursini/ were released under the natural conditions of an open-air cage, 19.5 x 15 m, in the Tashkent snake garden. In July-August, the snakes emerged from hiding as soon as the sun warmed the earth, and retired at air temperatures at ground level of 28-33° C. They remained in hiding as long as 19 hours, but emerged when ground-level air temperatures lowered to 22-25° C. In September the temperature dropped to and remained at 11-27° C; then the vipers were frequently found abroad near noon at temperatures of 18-25° C, were active all day on cloudy days, and fed at all times.

65. Khozatskiĭ, L. I. (Leningrad Univ.) Biomechanics of the integument of amphibians and reptiles. (97 lines)

66. Tsarevskiĭ, S. F. (Kazan.) Systematics of the "round-head" lizards (Phrynocephalus). (51 lines)

67. Chernomordikov, V. V. (Moscow Univ.) and Z. N. Kovaleva (Moscow Zoological Park.) Causes of gigantism in mesozoic reptiles. (23 lines, 1 table) Contrary to expectation for poikilotherms, our tests reveal that small lizards, snakes and

turtles consistently use more calories/kg/day than larger ones (a table gives data for three lizards of different species, three of snakes, two of turtles). Therefore one cause of gigantism in Mesozoic reptiles may have been the survival value of a size consistent with the greatest efficiency of use of food.

68. Shammakov, S. (Academy of Science, Turkmen SSR, Institute of Zoology and Parasitology.) On the number of species and individuals of reptiles of the small mountain ranges of western Turkmen. (21 lines) In the Kiuren-Dag (23 species), Malyi Balkhan (23 species) and Kara-Goz (14 species) ranges occur 29 species (19 lizards, nine snakes, one turtle). Agamids were the most abundantly encountered lizards (60.4%, 1.3/10 km), Eremias next (37.9%, 12.7/10 km). Vipers were the most abundant snakes (64%, 1.3/10 km). For every 10 km, 37.5 specimens of all reptiles were found, and of these 35 belonged to Agama, Phrynocephalus, Eremias and colubrid snakes. The greatest abundance occurred in Kiuren-Dag (41.3/10 km), the fewest in Kara-Ges (16.9/10 km), intermediate in Malyi Balkhan (32.6/10 km).

69. Shepilov, S. A. (Central Asiatic Zoological Center.) Distribution and differentiation of the reptiles in the mountain ridges in Nurata. (27 lines)

70. Shilova, S. A. (Moscow.) Food of the spadefoot toad /Pelobates fuscus/ in the southern forested Massifs. (18 lines) The spadefoot was found in most biotopes in the Kharkov and Kuibyshev regions, most abundantly in pines. In June-July activity begins at about 10:30 PM and continues to dawn. Beetles form most of the diet. Little selectivity is evident. Pests rarely are eaten. The spadefoot is of little economic value.

71. Shipilov, B. A. (Leningrad.) Daily cycle of activity of the grass frog /Rana temporaria/. (15 lines)

72. Shcherbak, N. N. (Academy of Science, Ukraine SSR, Zoological Institute.) The reptile as a model for study of the process of acclimatization in animals. (37 lines) Our studies on lizards of the Crimea show that color depends upon locality, and size and proportions of body depend upon ecological conditions. Bright lizards /Lacerta agilis/ are variable in color and pattern because they live in mountainous regions of varied ecology. In the Crimean lizard /L. taurica/ the number of blotches is directly dependent upon the aridity of the biotype. The Cliff lizards /L. saxicola/ of the Crimea which inhabit arid areas are grayer, less bright. Mapping of occurrence of melanistic reptiles shows that melanistic Common vipers /Vipera berus/ and Bright lizards are most often, or are exclusively, found in the steppe zone. Melanism in /V. berus/ is a phenomenon of later growth since normally-colored offspring are produced by melanistic females. Experiments are in progress to investigate the mechanisms of color change in reptiles.

73. Iur'ev, K. V. (Academy of Science USSR, Zoological Institute.) On the ossification of tendons of dinosaurs. (44 lines)

74. Iakovleva, I. D. (Academy of Science, Kirghiz SSR, Institute of Zoology and Parasitology.) On the subspecies of variegated lizards in Kirghiz. (27 lines) A statistical analysis of 324 examples of Eremias arguta shows that the population of the Chuiski Valley belongs to E. a. arguta, whereas that of Priissykkul' appears most similar to E. a. usbekistanica, but may be distinct. Solar radiation, resulting from high altitude (1600-2000 m) and isolation may account for differentiation of the Priissykkul' population.

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institutions

NEWS FROM OUR UNIVERSITIES, MUSEUMS, ZOOS AND OTHER INSTITUTIONAL MEMBERS

Impressive New Aquarium and Reptile Building for Milwaukee County Zoological Park.

Scheduled for completion this fall, a near million dollar structure at the Milwaukee County Zoological Park will serve as both an aquarium and a reptile building.

The aquarium portion will contain three large exhibits: a 65,000 gallon exhibit, centrally located on the main floor, for North American game fishes; a 45,000 gallon tank for fresh-water porpoises, and an 8,000 gallon Amazon River exhibit. Filtering will be accomplished with DE and sand & gravel beds located in the basement. Two smaller (300 gallon) tanks for the display of salt water fish will round out the aquarium, which will be under the supervision of aquarist Ken Schoenrock.

Two thirty-five foot enclosures are planned for the reptiles, one for crocodilians and the other for large lizards. Both will include spacious pools, waterfalls, decorative rockwork and live plants. Three large cages, with pools, will be provided, each capable of housing four or more tanks for the exhibit of small reptiles and amphibians. One of these areas will be air-conditioned; another, de-humidified. Eighteen cages, three to nine feet wide, will house a variety of medium-size snakes and lizards, and an eight-foot cage/pool combination will serve for the exhibition of turtles.

All cages will be tile-walled and heating will be supplied by forced hot air passed over germicidal lamps. In order to meet the thermal requirements of individual species, thermostatically controlled heating coils will be located in each cage floor; in addition, a light fixture will be mounted above the ceiling of each cage so that heat or sun lamps may be added.

Some behind-the-scenes features will include: three shift areas for the safe management of King Cobras, Mambas, and the large boids, pythons, and lizards; a pull-cord snakebite alarm, circumventing the entire area of reptile exhibits; spacious service runs, eight feet wide, to facilitate the safe handling and maintenance of reserve specimens; separate offices for the aquarist and reptile supervisor; a keepers' lunch and locker room; a food storage and preparation room; and laboratory. A mouse room, reptile-holding room, and reserve fish pools will be included in the basement.

These facilities should provide a maximum in efficient operation and healthful management for a representative collection of reptiles, amphibians, and fish. At the same time, the building's interior and exterior decor will be pleasing to the eye, with fieldstone and tile highlighting the architect's design.

(—David Zucconi, Supervisor of Reptiles)

The University of Texas Dedicates New Field Laboratory.

The University of Texas at Austin opened the Brackenridge Field Laboratory, 2701 Lake Austin Boulevard, with formal dedication ceremonies on 21 April 1967. The Brackenridge Field Laboratory is designed for research on environmental factors controlling numbers and kinds of organisms. There are several large outdoor enclosures that can be manipulated so that certain environmental influences, such as temperature and light, can be altered while keeping other factors constant. These enclosures also permit investigators to regulate the numbers of predators or prey for studies of the interaction between organisms.

The morning dedication ceremonies included introductory remarks by University officials, Chairman of the Board of Regents, Frank Erwin, and Dr. J. T. Spencer, Director, Special Facilities and Programs, National Science Foundation. Dr. W. Frank Blair will serve as Director of the Brackenridge Field Laboratory.

After a barbecue lunch, there was a symposium entitled "Effects of Environmental Manipulations on Natural Populations." Speakers and their topics were: Donald S. Farner, University of Washington, "On the Use of Environmental Information in Control of Reproduction," H. G. Baker, University of California, "Genecology and Weediness in Ageratum (Compositae)," E. B. Edney, University of California, 'Water Balance in Some Desert Arthropods," and H. T. Odum, University of North Carolina, "Ecosystem Designs."

(—J. P. Kennedy)

Evolutionary Biology Program at the University of Chicago.

The University of Chicago has recently begun a major expansion in the area of evolutionary biology. Degrees are granted by the Division of Biological Sciences (by the Division of Social Sciences for physical anthropology), and the program is interdepartmental. Research in areas joining traditional disciplines is emphasized as well as research within these disciplines.

Close ties are maintained with the Field Museum of Natural History and with the Brookfield Zoo. The Field Museum has important collections in the areas of paleontology, recent vertebrates and invertebrates, anthropology, and botany. The Brookfield Zoo is also one of the largest in the world and is unusually interested in pursuing the comparative investigations that are made possible by its collections. The breadth of the University's evolutionary biology program is increased by these cooperative arrangements. Close association is also maintained by individual faculty members with a number of marine and terrestrial biological laboratories throughout North and Central America, and field expeditions from the University and the Field Museum are made every year. Students are encouraged to partake in these expeditions whenever appropriate.

The doctoral program consists of about two years of courses and about three years of research. There

is a language requirement. The program is flexible and is constructed for the interests and needs of individual students.

Staten Island Zoo's Reptile Collection.

The reptile collection at Staten Island Zoo is by no means the largest in the Nation, let alone in the world (as has been stated from time to time in print, much to our embarrassment) but it is one of the outstanding collections in this country, and has for years enjoyed an international reputation for excellence.

Staten Island Zoo opened its doors for the first time in June of 1936, and has always emphasized the reptiles and particularly snakes. In recent years, partly by accident and partly by design, the rattlesnakes became a specialty of this collection. There were rarely less than two dozen forms on display at one time, among them some that had never been exhibited anywhere before. By 1941, the fifth year of the Zoo's existence, an impressive number of species had been acquired including such rarities as Crotalus unicolor, the Aruba Island Rattlesnake, Crotalus willardi, what was then called Willard's Rattlesnake, and a paratype of the then newly described Crotalus totonacus (G loyd & Kauffeld) now considered a race of C. d. durissus.

Conditions in our Zoo seem to favor the rattlesnakes, and some of them survive for a good many years. By virtue of this, the number of forms continued to increase until by 1960 it seemed there was a likelihood of our acquiring all the 32 species and subspecies of Crotalus and Sistrurus known to occur in the United States. This was finally accomplished by diligent exploitation of purchase, gift and exchange, and in no small part by personal collecting by members of the staff. By late 1964, we had 38 species and subspecies including all 32 U. S. forms. But our success was short-lived, for a few months later an epidemic carried off some of our best specimens of species of key importance. So it was that three specimens of the rare Chihuahua Ridge-nosed rattlesnake, Crotalus willardi silus, that had thrived for more than three years were among the casualties, together with others of which we had only single examples.

Happily the epidemic was rather speedily checked, and a year later we were complete once more in the United States series. At the time of writing, this series has been intact for nearly 17 months, and bids fair to continue so indefinitely. Meanwhile we have been building a duplicate series as stand-ins for many of the forms of which we have only one specimen, and some of which have grown old in our collection. Lacking only three or four forms, we now have a nearly duplicate series for the United States, and likely will complete it by the end of the year. At the moment we exhibit 37 forms, and in the course of the year, the total number of specimens hovered about 100 adult and subadult examples. Of these, 21 specimens of 17 forms have survived with us from five years to more than 12, and 32 specimens between two and five years. All are still living.

We believe that this is the largest aggregation of rattlesnakes, variety-wise, exhibited together in any one place at the same time, and that we are the first to exhibit all U. S. forms at one time. At least our claim has not been challenged. Only San Diego Zoo exceeds us in the number of kinds displayed over the years— more than 42 forms.

The collection otherwise contains much of interest. In addition to a number of different kinds of pythons, boas, mambas and vipers, we boast the only living U. S. example at the moment of the rare Black Desert Cobra, Walterinnesia aegyptia. Known only from a few preserved specimens, this rare snake had reached the United States alive only once, before we acquired our first specimen in early 1966. Unhappily, this snake lived only five days, but was replaced later in the year by a second which seems to be thriving. After we lost our first specimen, New York Zoo (Bronx) acquired one also but it has since died.

We also boast a two-headed turtle which fascinates the public but is of little scientific interest. Nevertheless, it is "cute"; the two heads are perfectly formed and completely separate, and the longer one looks at the more fantastic it seems. The specimen is a hatchling False Map Turtle, Graptemys p. pseudogeographica, shipped to a New York dealer in a batch of baby turtles from Louisiana. It seems to be thriving and has even shown some growth in the nearly six months we have had it.

During 1966 we exhibited 484 specimens of 128 species of reptiles; figures for the amphibians are not yet available.

(—Carl Kauffeld)

Information Services Available Through Subscription from the Institute of Scientific Information.

ASCA (Automatic Subject Citation Alert) is the first commercially available large scale computerized information system designed specially for the individual scientist. A scientist can indicate his subject interests by telling the ASCA system what words, word stems and phrases describe his areas of interest. The ASCA system then automatically sends him weekly computer printouts reporting new research of interest to him.

ASCA examines current journals as fast as they appear, extracts those items related to the scientist's selected interests, and mails him a personal computer printout each week. The report gives complete bibliographic data for the items retrieved. If no findings are made in a given week, the scientist still receives a report confirming that a search was conducted for him. The basic rate for ASCA is $100 per year.

Another service of ISI, Original Article Tear Sheet (OATS) service, includes a 24-hour telephone service for subscribers to provide greater convenience in obtaining original journal articles. Tear sheets are taken from extra copies of source journals in ISI's library and mailed to subscribers within hours after a request is received. Government procurement regulations permit grantees and contractors to charge information services (such as OATS) directly against grants or contracts.

ISI information services also include the sale of computer developed magnetic tapes to universities

and private industry. The interdisciplinary tapes are sold on a yearly subscription and delivered on a weekly basis. ISI Magnetic Tapes for 1967 contain information published in more than 1600 key scientific and technological journals from all over the world. Entries include research articles, reviews, meeting proceedings, letters to editors, and even references cited in the bibliographies of articles covered. For additional information, contact ISI, 325 Chestnut Street, Philadelphia, Pennsylvania 19106.

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ATTENTION DEALERS: Am interested in obtaining the names and addresses of dealers and/or supply houses which specialize in the sale of reptiles and amphibians. Send price lists to: GEORGE M. BROOKS, Jr., 8122 S. Avalon, Chicago, Illinois 60619.

AMBYSTOMA INFO NEEDED: Am interested in corresponding with persons having experience in raising Ambystoma from larval stage to adult, with particular reference to histological development of teeth. Write to IRV R. RUEGER, 3601 Stratford Rd., Evansville, Indiana 47710.

DESIRE INFORMATION: Would like information and/or references on reptilian anatomy; also data on reptilian diseases, methods of treatment of effecting cure. Need names & addresses of reputable reptile dealers offering western, southern & exotic species. SYLVESTER E. DIETRICH, Route 2, #142, New Haven, Missouri 63068.

IMPORT INFO WANTED: Need info regarding restriction on importation of reptiles & amphibians from Switzerland to U. S. CHARLES D. MILLER III, c/o Pomfret School, Pomfret, Connecticut.

SEPARATES FOR SALE OR TRADE: My duplicates; for list write to: STEVEN WEINKSELBAUM, 3010 Clarendon Rd., Brooklyn, New York 11226.

DIRECTORY: Am interested in accumulating info on all professional & amateur herpetological societies in U. S. with objective of preparing a directory of same. Need addresses and brief description of each. STEVE SCHMIDT, 549 Forest Dr. SE, Cedar Rapids, Iowa 52403.

SNAKE HEALTH: Request information on methods of ridding ticks from snakes & cages. Contact: C. C. BLACKWELL, Jr., 4550 West 26th Street, Chicago, Illinois 60623.

NEW SOCIETY: Our members in Chicago & surrounding environs should note the formation of the Chicago Herpetological Society. The CHS meets monthly and publishes a bulletin. Interested persons should write to: JAMES E. SEYMOUR, 4132 N. Clarendon Ave., Chicago, Illinois 60613.

SUPPORT NEEDED: Kentucky Chapter of Nature Conservancy is fighting to save the well-known "Murphy's Pond", an area in southwestern Kentucky noted for its varied reptile & amphibians fauna, and one of the last natural stands of cypress in the north Mississippi River basin. Contributions are greatly needed and may be directed to: THE NATURE CONSERVANCY, Kentucky Chapter, P. O. Box 5005, University Station, Lexington, Kentucky 40506.

LITERATURE WANTED: Wish to obtain original copies of both volumes of Schneider's Historiae Amphibiorum, 1799 & 1801. JOSEPH T. COLLINS, 5807 Montgomery Road, Cincinnati, Ohio 45212.

PENNSYLVANIA MATERIAL OFFERED: Members in need of material from the Allegheny Mountain section of wouthwestern Pennsylvania are invited to contact RAY ASHTON, Jr., 550 S. Main Street, Oxford, Ohio.

Send ads to C. J. Hirschfeld, Ed., 9045 Indian Ridge Rd., Cincinnati, Ohio 45243

the Literature

LORQUINIA. Complete sets of this journal of the Lorquin Natural History Club of Los Angeles are still available from the Southern California Academy of Sciences, Los Angeles County Museum, Exposition Park, Los Angeles, California 90007 (Vol. 1-2, 1916-1919, $1.00 complete set). Included are several herpetological papers on the southwest by H. Hillman, P. D. R. Ruthling, and others.

MICROFICHE. Microfacsimiles of books on transparent sheets of safety film, size 9 x 12 cm, each card containing 40-70 pages of material. Several herpetological titles are available. Complete catalogue of books and periodicals on microfiche is available from Inter Documentation Co., Poststrasse 9, Zug, Switzerland. List of herpetological titles will appear in next issue of the Review.

review

NATURAL HISTORY OF COTTONMOUTH MOCCASIN, AGKISTRODON PISCIVORUS (REPTILIA). By Ray D. Burkett. University of Kansas Publications, Museum of Natural History, 17(9): 435-491. 7 figs, 13 tables, 1966.

This is another in the important series of studies on the natural history of reptiles and amphibians that have emanated under the guidance of Henry S. Fitch from The University of Kansas Natural History Reservation during the last decade.

The present publication is the result of study of 306 cottonmouth moccasins and at least 115 references published within the years 1895-1963. Unfortunately, most of the snakes were already preserved when studied. This is not to say that Burkett has not used well his preserved material or the 25 live cottonmouths that he kept in the laboratory for the purpose of studying behavior, fang shedding and for comparison of measurements with preserved specimens. It is to say that in reading this monograph one is continually aware of the lack of information that might have been gained from a long term marking study of a natural cottonmouth population. Field data on movement, home range, population turnover, reproductive success and so on would have greatly contributed to a study of the natural history of the cottonmouth. I am fully aware of the difficulties, temporal and others, in obtaining such data. Nevertheless, while we await that kind of information which is slowly being retrieved we can be thankful for Ray Burkett's informative study of one of the often written about, but previously little known snakes of the United States.

Information is presented on systematics, distribution, description, habitat and limiting factors, reproduction, growth and development, shedding, food habits, mortality factors, behavior, venom and the bite. There is also a case history of a bite and a review of treatment. The author's objectives were to (1) learn as much as possible concerning the natural history and economic importance of the cottonmouth; (2) determine what factors limit its geographic distribution; (3) determine the role of the cottonmouth in its ecological community and (4) compare the cottonmouth's life history with that of other crotalid snakes, especially the kinds that are most closely related to it.

The omission of pertinent literature is a shortcoming that is not restricted to me. It is also seen in Burkett's study. It would not seem unreasonable to expect citation of the admittedly very meager information on movement of a marked cottonmouth in a Louisiana swamp (Tinkle, 1959, Amer. Midland Nat., 62(1): 189-205) or the observation of Rossman (1960 [1959] Jour. Florida Acad. Sci., 22: 207-225) on a 1067 mm cottonmouth that regurgitated a 940 mm mud snake or perhaps that of Petzold (1963, Bijdr tot de Dierkunde, 33: 61-69) on reproduction and juvenal development. The ease of monographers in overlooking references needs no explanation.

Several conclusions of general interest can be briefly mentioned. The northern edge of the cottonmouth's geographic range is apparently limited by low temperatures in winter; the western edge of the range is probably limited by the lack of favorable habitats that have resulted from insufficient precipitation. On the basis of old distributional records it appears that the range of the cottonmouth has decreased in the last 100 years.

Interestingly, Burkett concludes that the mature female cottonmouth usually bears young every other year, a conclusion supported by the Florida field study of Wharton (1966, Copeia: 149-161). In my judgement the objective that is the least well achieved is the attempt to define the role of the cottonmouth in its ecological community. That kind of precise information is just not available.

Perhaps the relationship between riches and virtue as stated by Plato is pertinent to many combination field and laboratory studies. Plato wrote that when riches and virtue are placed together in the scales of the balance, the one always rises as the other falls. The advantages of combining information from the laboratory and the field study of organisms are clear. We may hope for the golden mean of Aristotle in future studies of the natural history of reptiles and amphibians but there is nothing here to suggest that Burkett does not realize this nor that he has not made a worthy contribution to our knowledge of the cottonmouth.

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recent titles

A Field Guide to Western Reptiles and Amphibians, by Robert C. Stebbins. 1966. Houghton-Mifflin Co., Boston. 279 p., 39 pls (mostly in color) $4.95.

The Reptiles of Japan, by Richard C. Goris. 1966. Shogakkan Publ. Co., Tokyo. 127 p., 16 color p. & 8 monochrome p., hard cover. $5.90 postpd. from publisher or author (Ikuei Technical College, Igusa 2-35-11, Suginami-ku, Tokyo, Japan). Every Japanese mainland reptile represented in color; both adult and juvenile forms shown when color & pattern differ. All photos original by author and over half illustrate animals never before represented photographically in the literature. Text in Japanese.

Of Scientists and Salamanders, by Victor Twitty. 1966. W. H. Freeman Co., San Francisco. 178 p. 57 illus. $4.50.

La Taxonomia y Zoogeografia de los Ophidios de Venezuela, by Jania A. Roze. 1966. Univ. Central de Venezuela, Caracas. 362 p., 80 maps, 79 figs., paper bound.

An English-Classical Dictionary for the Use of Taxonomists, compiled by Robert S. Woods. 1966. Pomona College, Claremont, California. $5.50 (from Rm. 201, Sumner Hall, Pomona College).

A Contribution to the Herpetology of West Pakistan,

by Sherman A. Minton. Bull. Amer. Mus. Nat. Hist., 134: 27-184. $5.00 from the Museum, New York.

Comparative Osteology and Evolution of the Lungless Salamanders, Family Plethodontidae, by David B. Wake. 1967. Southern California Academy of Sciences, Memoir no. 4. 111 p., 33 figs. $6.50 (order from Los Angeles County Museum of Natural History, 900 Exposition Boulevard, Los Angeles, California 90007).

Phylogenetic Systematics, by W. Hennig, trans. from the German by D. D. Davis and R. Zangerl. Univ. Illinois Press, Urbana. $12.50.

The Tuatara, Lizards and Frogs of New Zealand, by R. Sharell. 1966. 94 p., 52 colored & 18 black & white photographs, cloth. $4.20 from Wheldon & Wesley, Ltd., Codicote, Hitchin, Herts., England.

The Principal Diseases of Lower Vertebrates, by H. Reichenback-Klinke & E. Elkan. 1965. Academic Press, N. Y. xii + 600 p. $20.00. Includes information on fish, amphibians and reptiles; how to keep them as pets or in research labs.

Fauna Japonica, Anura (Amphibia), by Y. Okada. 1966. Biogeographical Soc. Japan. 234 p., 24 pls. (3 in color), clothbound, in English. $19.00 from Biogeogr. Soc. Japan, National Science Museum, Uyeno Park, Taito-ku, Tokyo. Forthcoming additions to this series include volumes on snakes by Okada, Koba & Matsui, lizards by Matsui, and on salamanders by Okada.

Men and Snakes, by Ramona & Desmond Norris. 1965. McGraw Hill, San Francisco & New York. 224 p. ca. $7.00.

Poisonous Snakes of Southern Africa, by John Visser. 1967. Price R4.50, postage 15 c, from Howard B. Timmins, Colophon House, Cape Town, South Africa. Chapters are: 1. Poisonous snakes of southern Africa and the effects of their venoms. 2. Factors affecting the severity of snakebite. 3. Antivenoms-spedificity, indications, and precautions. 4. Treatment of snakebite, first-aid and medical. 5. Appendices, First-Aid measures; Case histories; Snakes in general, questions & answers.

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THE FOLLOWING LIST of recent herpetological articles includes titles appearing in journals other than Copeia, Herpetologica and the Society Journal.

Altig, R. 1967. Food of Siren intermedia nettingi in a spring-fed swamp in southern Illinois. Amer. Midland Nat., 77: 239-40.

Akin, G. C. 1966. Self-inhibition of growth in Rana pipiens tadpoles. Physiol. Zool., XXXIX: 341-356.

Alvarez, T. 1964. Variación y descripción de una subespecie de Bipes canaliculatus (Reptilia: Squamata) de Michoacán, Mexico. Anal. Escuela Nac. Cienc. Biol. Mexico, 13(1-4): 145-152 (B. c. multiannulatus, ssp. nov.)

Baker, R. H., R. G. Webb & P. Dalby. 1967. Notes on reptiles and mammals from southern Zacatecas. Amer. Midland Nat., 77: 223-226.

Ballinger, Royce E. & Charles O. McKinney. 1966. Developmental temperature tolerance of certain anuran species. Jour. Exp. Zool., 161: 21-28.

Banta, B. H. 1966. A checklist of fossil amphibians reported from the state of Nevada. Occas. Papers Biol. Soc. Nevada, (13): 1-6.

Brandon, Ronald A. & N. R. Austin. 1966. Notes on a collection of amphibians and reptiles from Monroe County, Illinois. Trans. Illinois State Acad. Sci., 59(3): 296.

Buden, D. W. 1966. An evaluation of Jamaican Dromicus (Serpentes, Colubridae) with the description of a new species. Breviora, (238): 1-10. (D. polyepis, n. sp.)

Clark, R. J., E. Clark & S. C. Anderson. 1966. Report on two small collections of reptiles from Iran. Occas. Papers California Acad. Sci., (55): 1-9.

Coates, M. 1967. A comparative study of the serum proteins of the species of Taricha and their hybrids. Evolution, 21: 130-140.

Davison, John. 1966. Chimeric and ex-parabiotic frogs (Rana pipiens): Specificity of tolerance. Science, 152: 1250-53.

Easterla, D. A. 1967. Blat rat snake preys upon gray Myotis and winter observations of red bats. Amer. Midland Nat., 77: 527-8.

Ferguson, D. W., H. F. Landreth, & J. P. McKeown. 1967. Sun compass orientation of the northern cricket frog, Acris crepitans. Animal Behav., 15: 45-53.

Gans, C. & C. Rhodes. 1967. Chirindia from Tanganyika (Amphisbaenia, Reptilia). Ann. Carnegie Mus., 39: 1-32.

Huheey, J. E. 1966. Variation in the Blue Ridge Mountain dusky salamander in western North Carolina. Jour. Elisha Mitchell Sci. Soc., 82: 118-126.

Kluge, A. G. 1967. Higher taxonomic categories of Gekkonid lizards and their evolution. Bull. Amer. Mus. Nat. Hist., 135: 1-60 ($2.50 from publisher)

McCoy, C. J. & C. F. Walker. 1966. A new salamander of the genus Bolitoglossa from Chiapas. Occas. Papers Zool. Univ. Michigan, (649): 1-11. (B. resplendens, n. sp.)

Nelson, Craig E. 1966. Systematics and distribution of snakes of the Central American genus Hydromorphus (Colubridae). Texas Jour. Sci., 1966: 365-371.

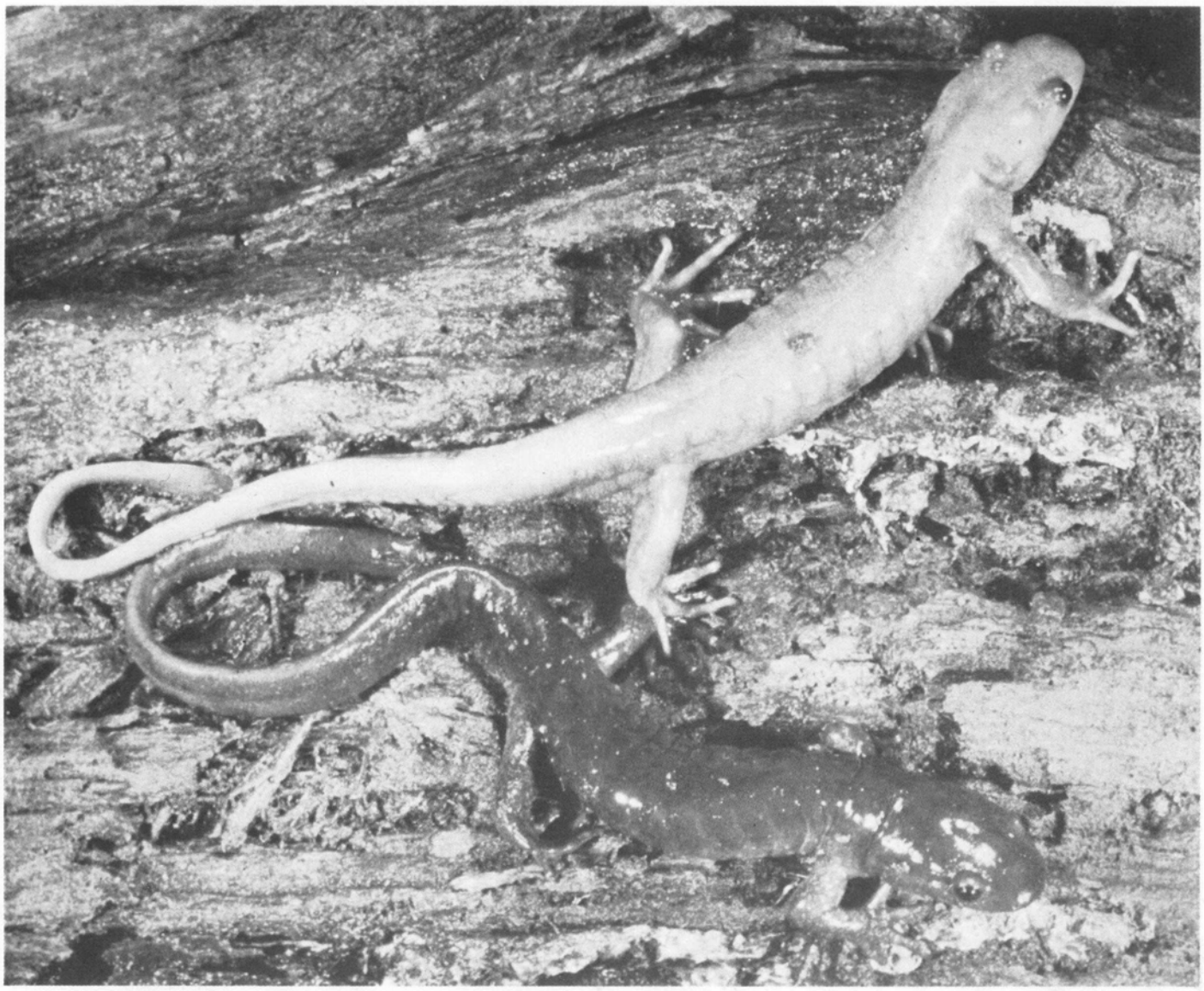
Pope, C. H. 1967. Bibliography of Clifford H. Pope. priv. print., 8 p.

Salthe, S. N. & N. O. Kaplan. 1966. Immunology and rates of enzymatic evolution in the Amphibia in relation to the origins of certain taxa. Evolution, 20: 603-16.

Schwartz, Albert. 1967. The Leiocephalus (Lacertilia, Iguanidae) of Hispaniola. II. The Leiocephalus personatus complex. Tulane Stud. Zool., 14(1): 1-53.

Wermuth, Heinz. 1966. Der Status von Platydactylus minutus Giebel. 1862. (Reptilia, Sauria Gekkonidae). Stuttgart. Beitr. z. Nat., (163): 1-6.

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Two salamanders of the Ambystoma jeffersonianum complex, one normal, the other albino, from a pond in Hamilton County, Ohio. The population, under study by George T. McDuffie and Joseph T. Collins of Cincinnati, contains representatives of the triploid A. platineum and is nearly 2% albino. Photograph by Karl Maslowski.